AVIATION WEEK

MAR. 12, 1951

McGRAW-HILL PUBLICATION

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A YEAR

A hen should do so good!

Hens are notoriously inaccurate—they lay their eggs *anywhere*.

But not the high-flying B-36.

The world's largest bomber consistently drops its load on target—even when flying full-speed at better than 40,000 feet.

One important reason for this precision is a special adaptation of the Honeywell Autopilot. Coupled with the bombsight, the Autopilot corrects for the slightest deviations in pitch, roll and yaw axes—holds the B-36 rock-steady throughout its bombing run.

That's just one of the many special jobs which Honeywell *automatic controls* are performing for the aircraft industry. We expect to do many more in the years to come—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

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MINNEAPOLIS
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Aeronautical Controls

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Flying a tight formation at speeds as fast as sound calls for extreme precision on the part of today's jet pilot. But in jet flying there is more precision than meets the eye! For instance, keeping a gas turbine spinning at rates as high as 40,000 RPM requires bearing tolerances measured in millionths of an inch! ☆ Bower bearings—because they are the finest precision bearings made—are used by nearly all manufacturers of jet aircraft engines. Pratt & Whitney, General Electric, Westinghouse, AiResearch, Solar—all have found Bower bearings thoroughly capable of standing the enormous speeds and temperatures so common to jet engine operation. New materials pioneered largely by Bower have proved more than equal to temperatures up to 600° F. And Bower bearings operate with complete efficiency on a "starvation diet" of lubricant. ☆ This is an excellent example of the high performance of Bower bearings in the aviation industry—bearings that are outstanding for precision, durability and quality.

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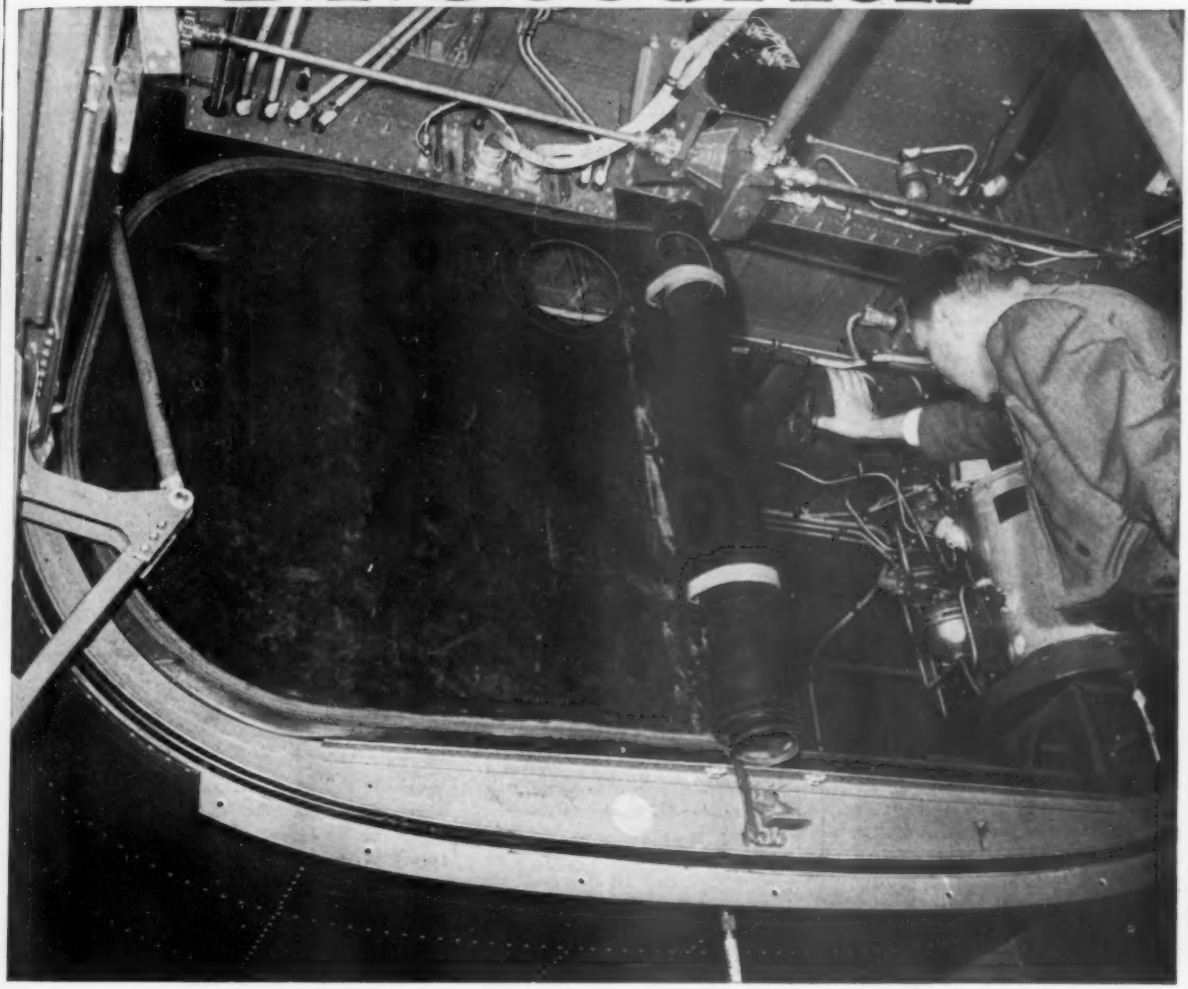
B.F.Goodrich



How to keep fumes from bothering a plane's nose

ENGINEERS at Lockheed were faced with a tough sealing problem. Gasoline fumes from the Neptune's bomb bay fuel tanks had to be kept completely away from equipment in the forward compartment. But the bomb bay couldn't be walled off. A ready entrance between the two compartments was needed.

Lockheed wondered if rubber might do the trick. They called in B. F. Goodrich. BFG engineers built a mammoth curtain to cover the entire width of the lower fuselage—made of fire-resistant fabric, coated with fume-resistant rubber. They made the curtain airtight—yet completely removable—by running a pressure sealing zipper all the way around the edge.

This B. F. Goodrich-developed zipper has overlapping molded rubber lips. They provide a 100% seal against fumes. And they make it possible to open the fume curtain in no time at all.

B. F. Goodrich fume curtains are now standard equipment on the Neptune.

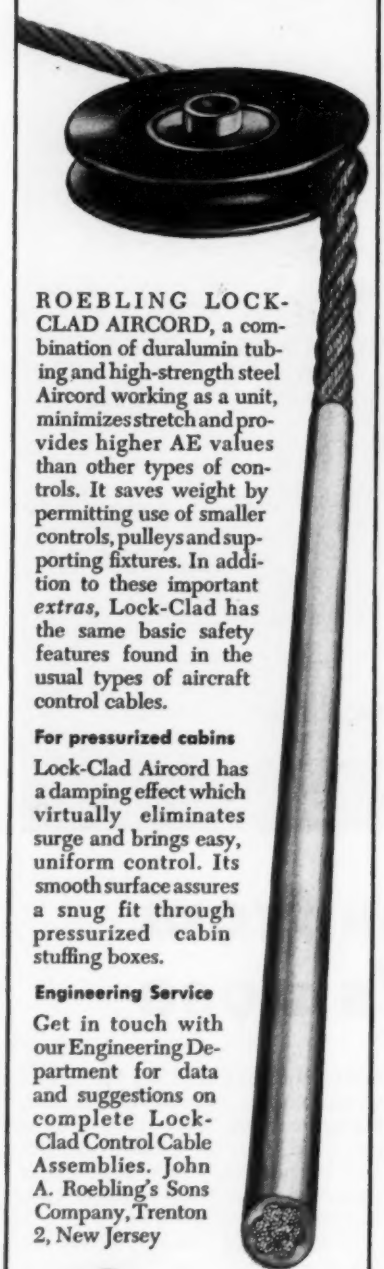
Besides fume curtain applications, BFG pressure sealing zippers are used for airplane doors, air ducts, inverter covers, control surface seals. They are extremely flexible. They fit snugly around complex shapes—such as squares, kidneys and the like where clamps won't seal. They are available in light-duty and heavy-duty sizes. They cement right onto either fabric or metal. They save space and weight.

If you have a sealing problem—or any other problem that BFG engineering might solve—get in touch with *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

AIRCORD

Roebling Lock-Clad assures highest efficiency and safety



ROEBLING LOCK-CLAD AIRCORD, a combination of duralumin tubing and high-strength steel Aircord working as a unit, minimizes stretch and provides higher AE values than other types of controls. It saves weight by permitting use of smaller controls, pulleys and supporting fixtures. In addition to these important *extras*, Lock-Clad has the same basic safety features found in the usual types of aircraft control cables.

For pressurized cabins

Lock-Clad Aircord has a damping effect which virtually eliminates surge and brings easy, uniform control. Its smooth surface assures a snug fit through pressurized cabin stuffing boxes.

Engineering Service

Get in touch with our Engineering Department for data and suggestions on complete Lock-Clad Control Cable Assemblies. John A. Roebling's Sons Company, Trenton 2, New Jersey

ROEBLING

Aviation Week

ABP Member ABC

Volume 54 **March 12, 1951** **Number 11**

Headline News

Rentzel to Get Key War Post..... 13
AF Decides to Buy Boeing XB-52.... 14
Our Expanding Industry..... 15
New Cutlass..... 16
NATO Jets..... 17

Financial

Subsidy Shapes Air France Course... 18

Aeronautical Engineering

Convair Trio: 240, Turboliner, 340... 21

Avionics

AF Tests New Navigation System..... 26

Production

Put Parts Where They're Neded..... 33

Equipment

PanAm Base Levels Work Peaks..... 40

Editorial

Frowzy Journalism..... 66

Departments

News Digest..... 7
Sidelights..... 8
Picture Page..... 9
Who's Where..... 11
Industry Observer..... 11
Washington Roundup..... 12
Production Briefing..... 36
Negotiated Contracts..... 37
USAF Awards..... 37
New Aviation Products..... 48
Also on the Market..... 49
Shortlines..... 57
Aviation Calendar..... 59
What's New..... 64

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Coming up—in numbers . . .
the Cutlass

THE U. S. NAVY has recently authorized substantial quantity production of the F7U-3, newest version of the twin-jet Vought Cutlass fighter airplane.

ONE of the fastest fighters in the world, the Cutlass has proved itself to be highly maneuverable, both at high speeds and high altitudes for combat, and at low speeds and low altitudes for carrier landings.

WHEN it joins the fleet in quantities, the new Cutlass will bring new striking power to the Navy's mighty air arm.

Chance Vought Aircraft

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INCREASED TIME BETWEEN MAJOR OVERHAULS

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CONTINENTAL AIR LINES' BIRTHDAY CAKE this year will be bright with 17 candles. Bright, too, is Continental's unsullied safety record of close to 500 million passenger miles. Today, the Continental fleet of five Convair-Liners and ten DC-3 planes serves 32 cities in Colorado, Kansas, Oklahoma, Texas, New Mexico and Missouri. Its safe, on-schedule flights are the result of unremitting maintenance vigilance and an uncompromising insistence on quality. *Engines of all Continental Air Line ships are lubricated exclusively with Texaco Aircraft Engine Oil.*

Best man to tell this story is Mr. A. P. Shelly, Continental Air Lines' Director of Engineering & Maintenance. Says Mr. Shelly:

"Texaco Lubrication Engineering Service has helped Continental greatly to increase the reliability of its aircraft power plants and safely extend operating time between service periods and major overhauls. Here's a specific case—

"Operation through unusually severe dust conditions was causing high lead wash of master rod bearings. Texaco Lubrication Engineering Service carefully checked every phase of our engine operation, service and overhaul . . . analyzed many samples of oil as well as the bearing metals . . . came up with a practical answer to the problem. We are happy to report a substantial improvement in bearing condition."

Continental Air Lines uses *Texaco Aircraft Engine Oil* exclusively for all its aircraft engines . . . and for air-frame lubrication uses only *Texaco Regal Starfak Special*. With the latter, one grease now replaces the five formerly used.

You can count on prompt and efficient technical service as well as quality products when you buy Texaco. Let a Texaco Aviation Representative show you exactly what this means in terms of increased efficiency and reduced costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, *Aviation Division*, 135 East 42nd Street, New York 17, N. Y.

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FOR THE AVIATION INDUSTRY

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

NEWS DIGEST

DOMESTIC

Glenn L. Martin Co. has received a new production order—its fourth—for the P5M-1 Marlin anti-submarine plane. The new schedule doubles previously planned production. In connection with its 4-0-4 transport production program, Martin has borrowed $4.5 million from the Reconstruction Finance Corp. and the Mellon National Bank on a $21-million line of credit agreement. Borrowings under the agreement now total $8.37 million.

Avro Jetliner landed at Wright-Patterson AFB for Air Force evaluation Later it was to go on to Wichita to be tested as a tanker in refueling operations. It is to be demonstrated to Air Force officials in Washington before returning to Canada.

Boeing Airplane Co. delivered the first C-97C Stratofreighter to the Air Force for assignment to MATS. The new C-97 model has the same gross weight as earlier versions, but can haul an additional ton of payload over short ranges. Its landing gear is interchangeable with that of the B-50 bomber.

William H. Graham, aviation editor of the New York Journal of Commerce, died as a result of injuries suffered in a crash into the sea of the Navy plane in which he was a passenger. Plane crashed on takeoff from a carrier off Korea. Mr. Graham formerly was an associate editor of Aviation Magazine, and served with the Air Forces in World War II.

Lyman Gilmore, pioneer aviation inventor, died in Nevada City, Calif., at the age of 74.

Kenneth R. Ferguson has resigned as vice president—operations and engineering of NWA to become an aviation consultant. His duties recently were taken over by Frank C. Judge.

Col. C. H. Welch, public information officer at Air Materiel Command headquarters, Wright-Patterson AFB, is retiring Mar. 31 after 34 years in the Air Force and its predecessor services. Lt. Col. Ray Taylor will be acting PIO at AMC.

New world records accepted by the Federation Aeronautique Internationale are: light landplane altitude: Miss Caro Bayley, 30,203 ft., set at Miami, Fla., Jan. 4, 1951 in a two-place Piper Super Cub powered with a 125-hp. Lycoming engine; single-place glider altitude: William S. Ivans, Jr., 42,100 ft., set at Bishop, Calif., Dec. 30, 1950, in a Schweizer SGS 1-23. Ivans' flight also set a new "altitude gained" record of 30,100 ft.

Robert J. Smith is resigning effective Mar. 15 as vice chairman of the National Security Resources Board to return to his post as president of Pioneer Air Lines.

Personal aircraft exports by nine companies in January totaled 49, valued at $188,826, AIA reports. In the previous month, the same number of companies exported 87 planes valued at $371,467.

Maj. Gen. Kenneth P. McNaughton, commanding general of AF's Lackland, Texas, reception center—recently criticized by a Senate committee for "hoarding" recruits—has been assigned the temporary job of Deputy Chief of Staff for Personnel in charge of civilian technical schools. AF denies that his assignment is related to the critical report, and says he will return to Lackland within 90 days.

First L-20 Beaver liaison plane of an Army order for four from de Haviland of Canada was scheduled to be delivered at Ft. Bragg, N. C., last week. Remaining three are due before the end of the month. The Air Force will order less than 150 Beavers as a result of its recent evaluation at Wright-Patterson AFB. The Army probably will order considerably more than that number from fiscal 1952 funds.

FINANCIAL

Northrop Aircraft, Inc. reports profit of $1,210,000 for the first six months of its fiscal year, ending Jan. 31. Backlog is highest in company's history, $195 million.

Ryan Aeronautical Co. reports profit of $635,165 for the year ending Oct. 31, 1950, on sales of $12,512,851. Sales dropped about $2.5 million, chiefly in the airplane division, but profit still was considerably greater than 1949's $358,052. Jan. 31, 1951, backlog exceeded $29 million.

Capital Airlines reports net profit after taxes of $8,342 for January, first time in the carrier's history that it showed a profit in that month. Operating revenues were $2,657,375, and operating profit was $36,028.

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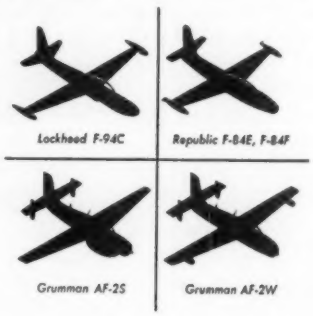
Motion is controlled *positively* by adjustable mechanical limit stops. The adjustable load-sensitive limit switches are de-energized whenever the actuator either reaches the limits of mechanical travel or encounters the maximum permissible load. This construction provides two essential characteristics for dependable operation of valves, dampers, etc., up to 50 inch-pounds maximum operating load:

1. Accurate positioning of the driven device
2. Elimination of damage from overtravel or overload

See condensed literature in 1951 I.A.S. Aeronautical Engineering Catalog or write for Bulletin 118.

ROTORette

is currently used on these planes



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ACCESSORIES CORPORATION

Note our new address: **1414 Chestnut Avenue, Hillside 5, New Jersey**

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SIDELIGHTS

Congress

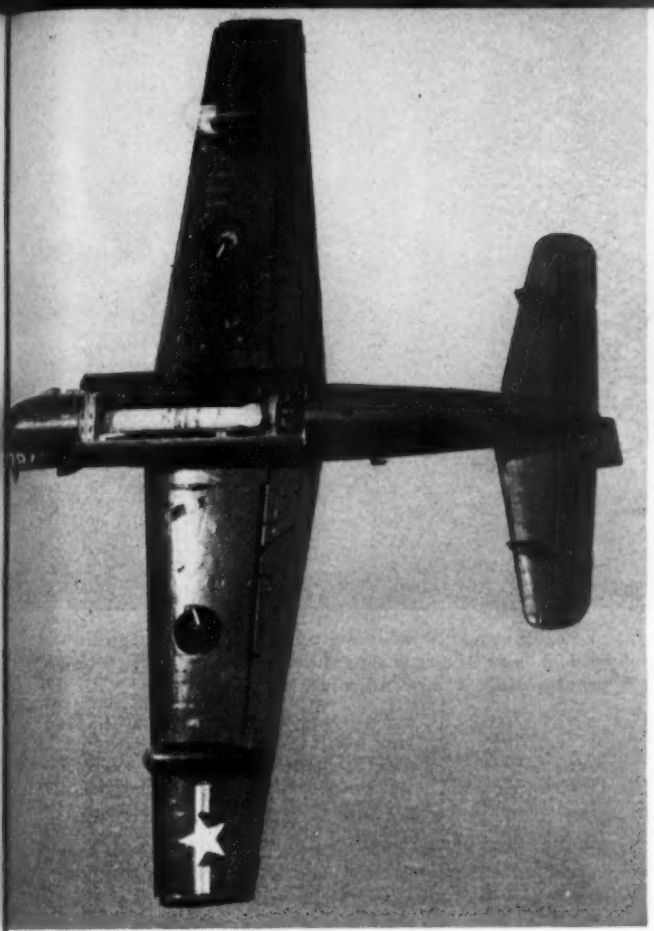
Rep. Teague's special committee which was given $60,000 to investigate alleged abuses in **GI training program** has no plans at this time for looking into aviation schools. . . . A big drive is on in Congress to set up a **small defense plants corporation,** which would get prime contracts from Defense Dept., and parcel them out in subcontracts to small business. Defense Mobilizer Wilson says it won't work. . . . That staunch backer of the single U. S. flag international airline, Sen. Brewster, now writes off the proposal as "an academic issue." He won't push the bill that his staff automatically introduced with others left over from last session. . . . Sen. Lyndon Johnson's preparedness committee will release a report late this month on **manpower wastage** at Air Force and Naval training bases; it has already accused USAF of "greed" in hoarding the cream of enlistees at its Lackland, Tex., base before they could be drafted by the other services. . . . An increase in **air mail postage** this year looks unlikely. The President didn't ask for it in his request for postage boosts.

Airlines

Northwest President **Croil Hunter** discredits report NWA wants to sell its Stratocruisers to USAF, then lease them back to fly the Pacific military run. He counters that if NWA disposed of any equipment it would be its Martin 2-0-2s. Another company spokesman told AVIATION WEEK the 2-0-2s might be sold south of the border. . . . **Slick Airways** will probably change its name; it's considering Slick Air Freight. The company is looking for more used freight planes. . . . Informed observers expect an early decision in the **New York helicopter case.** They believe CAB will follow its examiner's recommendation and grant a certificate to New York Airways, Inc. . . . A 110-mph. tail wind pushed a **Northwest Stratocruiser** to a new, unofficial record of 3 hr., 42 min. Mar. 2 from Anchorage to Seattle, for average ground speed of 406 mph. over the 1500 mi., at 24,000 ft. The ship flew at normal horsepower setting; it carried 30 passengers. . . . **Pan American** has been evacuating wives and children of its employes from Hong Kong.

Industry

AIA reports difficulty by virtually all companies in obtaining aluminum steel and magnesium **forgings,** due to lack of extrusion capacity for forging stock. . . . Howard Hughes in filing **suit against RFC** for clarification of contract terms, says he has spent $17 million of his own money on the Hughes flying boat, in addition to the $18 million put up by the government. Furthermore, Hughes Aircraft is spending $300,000 each month to prepare the ship for further flight tests. No date for the next flight has been set. Suit was filed in Houston by Hughes Tool Co., asking $1,733,975 due under contract terms with RFC.

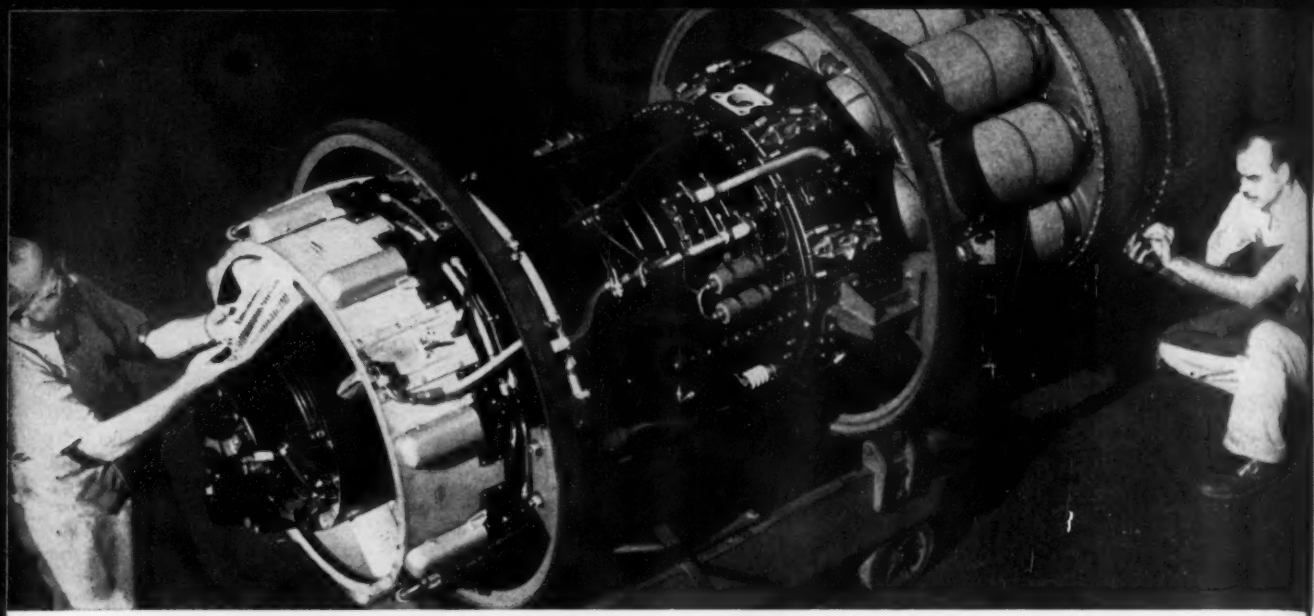


SUB HUNTER-KILLERS, INC.—A Grumman AF-2S sub-killer (left) banks steeply, its large open bomb-bay doors exposing an unidentified weapon. Wheel wells of the outboard folding landing gear are exposed. Note dual tail wheels. Above is a view of the AF-2W hunter with wings folded aboard a light carrier during trials. The huge bulge under the fuselage is a surface-scanning radar. Its large size causes sufficient side effect to necessitate fitting of auxiliary stabilizing fins to the tail. Both models are in large-scale production at Bethpage, N. Y.

Military Aviation Picture Highlights

RAF PICKS PERCIVAL—The P.56 (right) side-by-side two-seater has been chosen by the RAF as its new standard basic trainer. The competition was heavy, with over 30 designs submitted by various British manufacturers. The P.56 comes in two versions, Mk. 1 (background) having the Armstrong Siddeley Cheetah of 420 hp., the Mk. 2 (foreground) with the 550-hp. Alvis Leonides. Mk. 1 has 149 kt. top speed, Mk. 2 does 173 kt.

SABRE MEETS CANUCK—Two of Canada's most important fighter projects pose for a portrait. The North American F-86A Sabre shown here established a world's speed record of 670 mph.; the Avro Canada CF-100 is a 650-plus two-seat all-weather fighter. The Sabre is being built by Canadair in Montreal.



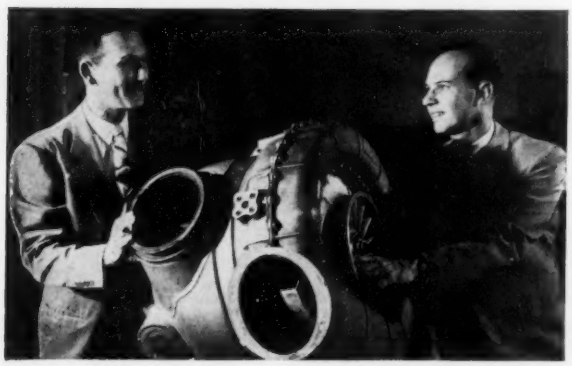
Latest production model of G-E J47 to be installed in USAF planes is J47-23. Unaugmented, it packs more power into the standard J47 frame size. Air Force has not yet released thrust but has indicated it is in excess of 5200 pounds. Anti-icing, opposite polarity ignition, and a new compressor having higher efficiency, greater airflow, are main features of -23.

IN THE NEWS

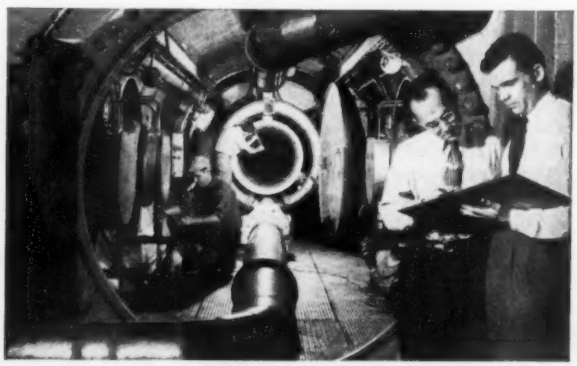
NEW ENGINE
NEW TURBO
NEW LAB

As specialists in every type of aircraft gas turbine, General Electric offers you a complete line of powerful propulsion units. Turbojets, turboprops, turbosuperchargers for piston engines are available to suit your specific needs. Forty-five years of experience are your assurance of quality and dependability.

For aircraft powerplants that keep ahead of the times, call your General Electric aviation specialist or write Apparatus Department, General Electric Company, Schenectady 5, New York.



New turbosupercharger promises longer ranges, heavier payloads to today's transport aircraft through greater power, lower fuel consumption, and greater simplicity. Now on test with Pratt and Whitney R-4360-C engine, it can be adapted to any engine of similar size.



Full scale compressor test stand in new Aircraft Gas Turbine Laboratory at Lynn, Mass. can run tests simulating altitudes up to 70,000 feet, temperatures to ±100F. The lab, newly opened, is dedicated to memory of Dr. Sanford Moss, early pioneer in aviation.

AIRCRAFT GAS TURBINES

GENERAL ELECTRIC

210-20

WHO'S WHERE

In the Front Office

L. L. Waite has been named vice president and directing head of the newly created Electro-Mechanical division of North American Aviation. Division will handle design, manufacture, development and production of electronic equipment and control guidance systems for missiles and aircraft. Another new NAA vice president is **Charles J. Gallant**. He will be general manager of the company's new Columbus division which will make F-86s and AJ-1s. Waite, who has been in charge of NAA's Aerophysics laboratory, will continue to direct that section's guided missile and nuclear energy programs. Gallant, who joined NAA in 1935, was previously with Douglas Aircraft.

Alfred B. Bennett has been made vice president-sales for the recently re-financed Taylorcraft, Inc. Bennett, well-known for his successful merchandising activities—he won first place in light aircraft sales for six years in the '30s—has been distributor for Piper and sales director for Aeronca.

Dan T. Buist has been appointed national sales director for Turco Products, Inc., replacing **Lou H. Moulton**, former vice president-national sales director, who resigned to handle his livestock ranch in Southern California. Moulton joined Turco in 1931 and has held various sales positions in the firm.

Charles E. Wilderman and **Daniel E. Waterbury** have been named vice presidents of Utica Drop Forge & Tool Corp. Wilderman came to Utica in 1945 from U. S. Steel; Waterbury joined them in 1946.

Richard D. Lemmerman has been made vice president in charge of engineering, research and development for Industrial Sound Control, Inc. He has worked for the firm on and off during the past five years.

Changes

Carl Wooten has been made sales manager for Aero Design & Engineering Co. . . . **Val C. Zimmer** has been named director of industrial security for Convair. . . . **Robert T. Wendt** has been named general manager in charge of Globe Corp.'s plants in Illinois, Wisconsin, and California. . . .

Harry D. Hanafus is purchasing agent for newly formed Westinghouse Electronic Tube division, with headquarters in Bloomfield, N. J. . . . **George B. Sisley** has been appointed production manager of Pacific Airmotive's Manufacturing division. . . . **Woodrum E. Woolwine** has been made assistant chief of structures at Northrop Aircraft. . . . **C. V. Johnson** has been appointed manager of the Mishawaka, Ind., plant of Bendix Products division. . . . **Orin K. Gaskins** has been promoted to manager of aircraft and related sales for Link-Belt Co.'s Ewart plant in Indianapolis.

Buell Patterson one time American Airlines public relations director, has joined Pan American-Grace Airways as director of publicity, coming from a post as public relations director for U. S. News & World Report. .

INDUSTRY OBSERVER

► Main reason for the huge jet engine production program recently announced by Allison and Chevrolet for the Allison J-35-A23 engine is the Boeing B-47C jet bomber. The B-47C is to be powered with four of the J-35-A-23s slung in single pods under the wings. Not until recently was it finally decided that the new Allison engine, rated at nearly 10,000-lb. thrust, would be used for the production version of the four-jet bomber.

► **Latest purchaser of a Convair 340 is United Aircraft Corp. which has ordered one plane for executive transport and experimental service testing. Plane is powered with Pratt & Whitney R-2800-CB-16 engines, and Hamilton Standard three-blade Hydromatic propellers, both UAC products.**

► Operating time between overhauls for the Allison J-33 turbojet has now been stepped up to 500 hr. by Air Materiel Command. The J-33 is the first American jet engine to be authorized for a 500-hr. interval between overhauls, and four engines have already gone the full route, the manufacturer states.

► **No. 2 Convair XP5Y-1, which is due to fly shortly, will be designed as a long-range mine-laying plane. But the small production order which Navy has already given Convair for R3Y flying boat transports, developed from the XP5Y-1 will not be changed. In fact the transport order may be increased as a result of a trend toward flying boat transports indicated in the recent British reports that the 10-engine 140-ton Saunders Roe turboprop Princess flying boats are for RAF Transport Command.**

► Latest use of Fiberglas reinforced plastic for structural materials is in the new experimental Hiller Hornet ramjet helicopter, which is fitted with a fuselage skinned with the glass plastic material.

► **British sources say that the English Electric Canberra light bomber is designed to carry a bomb load "as heavy as that carried by the more conventional four-engine piston bomber," indicating that USAF may have another atom-bomb carrier in the Canberras that Glenn L. Martin Co. is going to build.**

► Latest gimmick in air-sea rescue is a radio-guided lifeboat developed by Air Materiel Command. Into the A-3 all-metal lifeboat dropped by parachute from an SB-29 search and rescue plane has been incorporated a five-frequency receiver which actuates controls on the boat. It matches a five-frequency transmitter control box operated from the plane. By signalling from the plane the operator can in sequence, start the engine, shift gears and steer to right or left.

► **Reports that Avro Canada is intending to shelve further work on the No. 2 Jetliner transport, at least temporarily, because of military commitments, have been discredited by representatives of the company. It is pointed out that work on the No. 2 plane has been slowed because of materials problems. Meanwhile No. 1 Jetliner is due for a visit and demonstration for military authorities at Andrews AFB, Washington, and Wright-Patterson AFB, Dayton, any week now.**

► Aero Design and Engineering Co. is accepting deposits in escrow on orders for the first production models of the Aero Commander light twin-engine transport, which is scheduled for delivery flyaway Oklahoma City beginning in September at a price of $45,000.

► **Results of the USAF interceptor competition for the first plane specifically designed to carry an air-to-air missile are expected to be made known to the industry competitors early in April.**

► Development of the Cierva Skeeter light helicopter has been taken over by Saunders-Roe, at Southampton, under a British Ministry of Supply contract. Flight tests are now being made with a Skeeter Mark 4, powered by a Blackburn Cirrus engine.

Washington Roundup

Navy Spokesmen Afraid?

Congressmen are starting to wonder whether Naval aviation, which took a thorough trouncing in the famed B-36 investigation, was so thoroughly cowed then that it dare not protest now—even if it ought to.

Naval airmen, back in 1949, were impatient at the limitations of a Naval air arm restricted to sea patrol and warfare, close-in land attacks and enemy land bombardment—logical Navy missions, in the opinion of military observers. The airmen envisioned taking a big bite of, and perhaps eventually swallowing, Air Force's logical mission, long-range strategic bombing. They hastily blueprinted a giant carrier to accommodate long-range planes for the purpose. Their tactic, publicized in the B-36 investigation, was negative: Discredit intercontinental strategic bombing, discredit USAF's ability to perform it. The outcome was severe censure for Naval aviation, more enthusiasm among congressmen and the public for USAF.

Today, Naval airmen evince complete satisfaction with a Naval air strength far below what the Joint Chiefs of Staff, in 1948, said was a "peacetime minimum." After former Secretary of Defense Louis Johnson's drastic cutback of Naval airpower, more drastic than his cutbacks in any other element of the military, they are now enthusiastic over a "build-up." But Washington observers say, "What a 'build-up'!"

The "build-up," authorized after the President's declaration of a national emergency, amounts to this:

Joint Chiefs of Staff set late 1952 as the "target date" for readiness for all-out war. The target strength approved —not yet implemented with funds—for Naval striking air power at that point is approximately 15 percent below the Naval air power that Joint Chiefs of Staff, three years ago, marked down as essential for "peacetime" standby in a troubled, but still peaceful world.

The Joint Chiefs of Staff then included Adm. Louis Denfeld for Navy, Gen. Omar Bradley for Army, Gen. Carl Spaatz for USAF.

These three top military men set down a 70-group USAF and a 12-division Army as essential peacetime components in 1948. Logically, under the "emergency," build-ups to a 95-group USAF and a 24-division Army by late 1952 have been approved, but aviation observers in Washington point out that illogically, a corresponding Naval air build-up hasn't been okayed.

These observers point out that events since 1948 point to a need for more Naval air power, not less.

A direct intercontinental war with Russia was then the over-riding concern. That meant overwhelming concentration on long-range strategic bombing—a reason Naval aviation wanted to edge into the USAF role.

U. S. knows now too that its major engagement in an all-out war will be with Russia. But Gen. Dwight Eisenhower, Secretary of Defense Gen. George Marshall, and other military leaders with complete access to intelligence reports, have put off the date for that engagement —as long as the U. S. retains its preparedness with intercontinental bombers—for as long as 20 or 30 years.

In the meantime, our world-wide military role will rely heavily on Naval power: hold dominance in the Pacific; hold the Mediterranean and the seas surrounding Europe; meet outbreaks at any of numerous trouble spots requiring control of the oceans for transport. In addition, Russia's all-out submarine construction program dictates more emphasis on anti-sub warfare. Naval aviation—patrol planes and lighter-than-aircraft—are two-thirds of that mission, with the anti-sub chaser the third.

Despite this apparent outlook for a greater need for Naval air power than was ever contemplated in 1948, Naval air power is being held down far below the minimum the JCS said was essential then. The details:

Joint Chiefs of Staff Denfeld, Bradley and Spaatz, called for Naval air power of 24 carrier groups, including 22 carriers, and 10,700 operating first-line aircraft, three years ago, for peacetime.

Now, Joint Chiefs of Staff Sherman, Collins and Vandenberg have approved a build-up in Naval aviation —to meet all-out war by 1952—to only 15 carrier groups, including 27 carriers, and only 8000 operating first-line aircraft.

Navy now has only 4000 first-line operating aircraft—less than half of the 1948 "essential" for peacetime.

Subdued Naval airmen state they "concur" in the program. Some congressmen ask: "Are they afraid?"

Observers say it'll take magic for Navy to reach its target of 8000 operating planes by late 1952. The story:

Last July, after Korea, JCS set a 7335-plane goal by late 1952 for the Navy. Navy said it would need 2832 planes promptly to meet the goal.

But JCS decided it wanted to approve funds for 2377 Navy planes only. BuAer's Rear Adm. A. M. Pride pointed out to Congress that this was 455 planes less than necessary to meet the goal—but he didn't ask for more funds.

Then came Nov. 24, the Chinese Communist attacks in Korea, and the JCS rush request for more money from Capitol Hill—but the request didn't include funds for the Navy's 455-plane deficiency.

Naval airmen didn't complain, though. Some aviation observers felt they showed satisfaction that Naval aviation was being allowed some funds for expansion of aircraft facilities—to produce planes sometime in the future.

Funds for the 455 planes to meet the 7335 goal, plus additional planes for the modestly increased 8000 goal, may soon become available—but around June, at the earliest.

Congressmen on the Armed Services and Appropriations Committees of the House and Senate cannot recall that USAF's Chief of Staff, Gen. Hoyt Vandenberg, ever endorsed the USAF program approved by the Joint Chiefs of Staff without adding a "but"—"but I would like to see it greater."

From Secretary of Navy Francis Matthews, however, they can draw no "buts." Though they have taken many pages of testimony querying him, they find no hint of dissatisfaction with JCS program for the Navy.

Last December's defense appropriation bill didn't include funds for the 455-plane deficiency in the Navy's program.

Times Change

Senators critically lunged into him last December, Defense Secretary Gen. George Marshall recalled, for not giving them the green light for an all-out build-up of the country's defense. He only wanted "partial mobilization."

Marshall commented last week: "But today the atmosphere is quite different. Now the questioning is not how much more do we need but why are we asking so much."

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Rentzel to Get Key Mobilization Post

As Commerce Undersecretary, he takes over coordination of transportation.

Presidential assignment of a young and vigorous aviation spokesman to a high place among transportation planners was hailed in industry circles last week as a move that would place air transportation on fairly equal terms with other types for the first time since mobilization began.

Mr. Truman's selection of Delos W. Rentzel, 41, as Undersecretary of Commerce for Transportation would remove him from the increasingly important chairmanship of the Civil Aeronautics Board and place him in a key post in the mobilization framework.

The Rentzel assignment followed an executive order (10219) of Feb. 28, in which President Truman gave the Commerce Dept. and the Inter-State Commerce Commission separate powers to direct transport mobilization.

▶ **Rentzel's Job**—The chief air transport mobilization control mandates given the Commerce Dept. in the order, and expected to fall under Rentzel's administration, direct it to:

- **Assemble and analyze** data on both Defense Dept. and civil air transport needs.
- **Meet requirements** of military and civil air transport by forming programs and carrying them out.
- **Assign planes** to the military where needed and redistribute remaining craft among the airlines to assure maintenance of essential civil routes and services.
- **Determine traffic priorities** and schedule needs "subject to such policies and orders as the Defense Production Administrator may prescribe."
- **Act as claimant** for materials and manpower for construction, operation, maintenance of civil air transport systems and facilities.
- **Set up any agency** or agencies the Commerce Dept. may need to do these things.
- **Use the services** of the CAB and other such federal, state and local agencies required.

The same general dictates went to Commerce (and thus its Transportation Undersecretary) for shipping and ship construction and to the Commissioner of the ICC for rail, highway, inland waterways transport and storage facilities.

The President ordered the Secretary of Commerce, ICC Commissioner, and Secretary of Defense to cooperate "to achieve the effective coordination of inland and ocean transportation. . . ."

A working agreement was understood to be in effect, at least temporarily, under which Rentzel would have mobilization assignments in his new post for air, maritime, coastwise shipping and street transportation. Rentzel's formal appointment and Senate confirmation are yet to come, although the selection has been announced.

Some observers wondered whether the new position would give him as much of a green light in transport mobilization as appeared on the surface.

Those close to the situation saw a potential conflict with the mobilization assignment already held by Defense Transport Administrator James Knudson. DTA was created by Executive order under sponsorship of the ICC, strong champion of the railroads. Until Rentzel's new assignment, this setup clearly gave the railroads the upper hand in defense mobilization.

Under the new arrangement, the work distribution of mobilization is expected to be more equitable, with regard to the air organizations.

▶ **The Plus Side**—One plus factor for aviation is Rentzel's familiarity with both regulatory and administrative sides of civil aviation. He and Donald Nyrop, Civil Aeronautics Administrator, have been in close touch since their early reorganization work together at CAA. and Nyrop is considered a likely successor for Rentzel as CAB chairman (see p. 51). In either post, Nyrop will be a considerable help to the new Transportation Undersecretary.

Rentzel is a former CAA Administrator, and previously had been president of Aeronautical Radio, Inc., and an employe of American Airlines. His assignment is the latest development in the rapid growth in importance of aviation's role in the mobilization effort, described in AVIATION WEEK Mar. 5 (page 39) and earlier.

▶ **Speed-up**—The job of Commerce boss of transportation reportedly has been Rentzel's aim for some time, but a longer stay at CAB had been planned.

NEW PRIZE TO RENTZEL: CAB chairman (left) steps up to Undersecretary of Commerce, and Donald W. Nyrop (right) is in line to take over the top post in CAB.

He has been there since last summer. In his new post, he will succeed Maj. Gen. Philip B. Fleming, who has been nominated as our ambassador to Costa Rica.

Rentzel's friends say he expects to rely heavily on staff work and recommendations from CAA and CAB in making his final decisions.

Minimum Radar Screen Complete This Year

Minimum radar warning screen to guard against possible enemy air attack upon the United States will be completed this year, according to Air Force Secretary Thomas K. Finletter.

He emphasized, however, that this screen must not be considered by any means as an adequate air defense warning system. The Air Force, he pointed out, looks upon the project only as a minimum net.

Congress last year authorized approximately $100 million for construction of a system which would provide a guard for the West Coast, northern U.S. borders, and the East Coast. These funds were also to be used in establishment of an Alaskan network which would be completed some time in 1951.

Canadian government officials are also working to throw a screen across

northern ramparts of Canada stretching towards Greenland and downward to coast of Maine. It is understood that some support for this project is being provided through U. S. participation in the Mutual Defense Assistance Program.

Air Force and Army officials have agreed that an "adequate" radar warning system would be an exceedingly costly program and virtually impossible to build. Estimates for a complete network, it is reported, range upwards of $5 billion.

Air Force officials indicate a more immediate need for development of high altitude all-weather interceptor aircraft to meet the threat of attackers that the contemplated system might spot.

Currently Air Force has no adequate very high altitude interceptor plane in production. The Lockheed F-94 is the only all-weather plane in production that is radar-equipped for its all-weather and its interceptor mission. Northrop's F-89 Scorpion now coming off production lines is another of the all-weather interdicter types but is not designed for very high altitude interceptor use.

Air Force has issued requirements to the aircraft industry for an interceptor which would be completely automatic, capable of attaining sonic speeds and operate at a ceiling of approximately 60,000 ft. The plane would be capable of carrying and launching a guided missile. Air Force expects to have such an interceptor in its stable of combat craft by 1954.

School Starting for Army Copter Pilots

Training courses for Army helicopter aviators are expected to be started by the Army Field Forces shortly after Apr. 1, to supply pilots for Army transport helicopter companies which are being organized at Ft. Sill, Okla.

Sikorsky H-19s and Piasecki H-21s are expected to be used, to haul troops and logistical supplies in forward areas of combat zones. Assignment of 23 of the large helicopters to each company, and assignment of one transport company to each division is programmed.

The definite training announcement is seen as another indication that the disputed weight limitation on aircraft to be purchased by the Army directly is soon to be scrapped. Decision as to whether Army or Air Force hereafter shall make the aircraft purchases will be determined by the function of the aircraft rather than by the weight limitation, which has been used heretofore. Substantial orders for the large Sikorsky and Piasecki machines are ready to be formalized by the Army as soon as the weight limitation is abandoned.

PRYING BOARD: Gen. Nathan Twining, chairman of the Senior Officers Board, and Lt. Gen. Edward Rawlings (right), join other board members . . .

Maj. Gen. R. E. Nugent (left), and Lt. Gen. John K. Cannon in inspecting the Canberra. These men and a few others make the decisions on what planes AF will buy.

AF Decides to Buy Boeing XB-52

Production quantity to be ordered although plane has yet to fly. But it still has to compete with new B-36.

By Ben Lee

An actual flight comparison evaluation of the eight-jet Boeing XB-52 against a sweptwing eight-jet version of the Convair B-36 promises to be the deciding factor in the competition for a large quantity production contract for the next U. S. intercontinental bomber.

Air Force Secretary Thomas K. Finletter last week disclosed that USAF will order quantity production of the XB-52 and two experimental versions of the sweptwing jet-engined B-36s as the first move in a stepup of this nation's strategic air force to all-jet status. (The Finletter announcement confirms AVIATION WEEK's Nov. 20 story which reported the competition between the two planes.)

In his first press conference since return from the Middle East, Finletter stated that the unusual procedure of ordering an experimental plane into production even before the first experimental version had been test flown was

Our Expanding Industry . . .

Expansion of the industrial base for U. S. defense production is moving forward slowly, but steadily.

Two indications of progress were reported last week:

• **"Substantial amount"** of the $600 million appropriated by Congress for loans for defense plant expansions last September has been used up, the President said. He asked Congress for another bite of $1 billion, out of the total of $2 billion authorized, for loans from now to the end of this fiscal year, July 1.

• **Approvals of certificates** of necessity for special amortization tax concessions to spur expansions totaled $1.8 billion through Jan. 31. Most of this, $1.7 billion, was for steel facilities. The certificates permit accelerated depreciation—in five years, instead of ten—reducing normal and excess profits taxation of corporations. Applications for certificates are stacking up in Washington. By the end of January, requests for certificates covering $6 billion in expansions were on hand.

Certificates for the largest expansions in aviation and related fields covered $27 million in magnesium expansions by Dow Chemical Co. and $24.9 million in aircraft expansions by United Aircraft Corp.—$19.8 million by Pratt and Whitney for aircraft engines; $2.6 million by Sikorsky division for helicopters and parts; and $2.3 million by Hamilton Standard for propellers and equipment.

Sixty other firms in the aviation field that have been given certificates for expansions, with the amount certified:

Owens-Corning Fiberglas Corp., $7,836,500, for fibrous glass; Radio Receptor Co. (no dollar amount set), for electronic equipment; Aeroquip Corp., $376,367, for flexible hose lines; Schafer Machine Co., $21,385, for parts; Sylvania Electric Products, Inc., $1,065,000, for electronics; Grumman Aircraft Engineering Corp., $88,825, for parts; the Parker Appliance Co., $503,221, for parts; and Micro Switch division of Minneapolis-Honeywell, $630,000.

Also Mechanical Products, Inc., $159,857, for electric appliances; Switlik Parachute Co., $249,048; Star Tool and Die Works, $230,000, for aircraft fixtures; Waldorf Instrument Corp., $59,423; for engine devices; Gitz Bros., $3,375, engine parts; Collins Engineering Co., $95,000, aircraft hardware; Thompson Products, $4,930,000, engine parts; Air Reduction Co., $562,125, liquid oxygen; Minneapolis-Honeywell Regulator Co., $6,104,618, electronics and parts; Union Oil Co. of California, $135,000; aviation gas; and Brooks & Perkins, $536,000, magnesium.

Also Tube Processing, Inc., $12,425, aircraft fuel lines; Experiment, Inc., $28,000, aviation research; New York Air Brake Co., $748,870, pumps; Island Machine Co., $45,928, parts; Cook Electric Co., $267,043, parts; Aircraft Fittings Co., $124,506, parts; Harvey Machine Co., $400,000, fuses; General Laboratory Associates, Inc., $81,000, ignition equipment; Gould-National Batteries, Inc., $1,051,500, parts; Raytheon Manufacturing Co., $2,720,000, parts; and the M. W. Kellogg Co., $127,733, rocket engines.

Also the Apex Tool Co., $135,754, engines; the M. B. Manufacturing Co., $108,240, engine parts; the Deutsch Co., $54,333, parts; Aircraft Products Co., $12,354, parts; Extruded Hinge Co., $21,500, parts; the Glenn L. Martin Co., $76,496; Republic Aviation Corp., $5,166,139; Blaw-Knox Division, $50,900, radar; Capital City Machine, $13,710, gages; Machlett Laboratories, $555,000, electronics; Progress Manufacturnig Co., $14,214, electronics; and Aero Trades Manufacturing Co., $30,000, parts.

Also Avco Manufacturing Co., $23,468, parts; National Water Lift Co., $47,803, housing assembly; Acme Industrial Co., $45,942, parts; South-Bend Screw Products, Inc., $75,551, engine parts; the Wel-Met Co., $412,534, parts; McDonnell Aircraft Corp., $1,115,922, parts; Cablair Products Co., $64,935, parts; Marcus Mason & Co., $83,071, parts; Boeing Airplane Co., $281,014; Lavelle Aircraft Corp., $135,574, engine mounts; Aero Supply Manufacturing Co., $118,000, parts; Sundstrand Machine Tool Corp., $3,377,780, parts; Aircraft Engineering Products, $52,464, parts; Axelson Manufacturing Co., $655,000, gears; Lewyt Corp., $2,895,783, communication equipment; Weatherhead Co., and $816,410, parts.

Other recent developments in our expanding industry:

Sikorsky Aircraft division of United Aircraft Corp. is increasing by one-third its production facilities at Bridgeport, Conn. A new shipping and office building and extension of the main plant will bring total area to about 500,000 sq. ft. This is the second time since the war that Sikorsky has expanded, completing new assembly and hangar buildings in 1948. . . .

Packard Motor Car Co. is expecting to employ about 28,000 on production of automobiles and the J-47 jet engine, for which it has received a large USAF contract (AVIATION WEEK Feb. 19). Packard says it will require 14 months to tool for the J-47, and another ten months for peak production. . . .

Edo Corp., College Point, N. Y., has received a "substantial contract" to build fins and rudders for the Republic F-84 Thunderjet. This brings Edo's backlog to more than $8 million. . . .

Bell Aircraft Corp.'s Helicopter division will occupy the Kenmore space recently leased from the government (AVIATION WEEK Feb. 5). Bell has leased one, and is negotiating for another building of the plant used in the war by Curtiss-Wright's Airplane division. . . .

Langley Corp., San Diego, Calif., manufacturer of fishing tackle, is adding 40,000 sq. ft. to its facilities to handle increasing business from Boeing, Lockheed, Convair and other aircraft builders. . . .

Cessna Aircraft Co. has added 47 percent more manufacturing space in a $2.5-million program at its three Kansas plants in Wichita, Hutchinson and Prospect. At Prospect, 160,000 sq. ft. were purchased and modernized; at Hutchinson, 25,000 sq. ft. were added; and at Wichita, 75,000 sq. ft. . . .

Gibson Refrigerator Co., Greenville, Mich., has received a subcontract from Kaiser-Frazer Corp. to build control surfaces and other subassemblies for the C-119C which K-F will produce . . .

North American Aviation, Inc. is leasing a total of 273,000 sq. ft. in six facilities in the Los Angeles area. . . .

Continental Aviation & Engrg. Corp., Muskegon, Mich., is preparing to build the Pratt & Whitney R-1340 piston engine under a license agreement now being negotiated. . . .

Carboloy Co. is spending $2.8 million to expand its production facilities for tungsten carbides. About $800,000 will go for an additional 13,000 sq. ft. at the present plant on 8-Mile Road, Detroit, and $2 million to construct and equip a new 45,000-sq. ft. facility at Edmore, Mich. . . .

being undertaken in reliance on the performance of the B-52's smaller prototype, the B-47.

Scope of quantity production of the B-52, he indicated, would depend upon results of an actual performance competition between the B-52 and the sweptwing B-36. Both Boeing and Convair are in the final stages of construction of their all-jet-engine bombers.

► **J-57 Powerplants**—Pratt & Whitney J-57 axial-flow turbojet engines, which will power both the XB-52 and the B-36, are in manufacture at East Hartford. One is about to be flight tested in a test bed installation aboard a Boeing B-50.

No cutback in present orders for the

XB-51 Future?

The Glenn Martin Co. has announced that in addition to its new Canberra production program, Air Force had authorized the company to "prepare one of its two experimental XB-51 light three-jet bombers, for use as a production prototype," indicating that the XB-51 is likely to be scheduled for production after further testing.

current B-36 is contemplated, Finletter indicated. If major quantity production of the B-52 is ordered as a result of the pending competition, he said, that production will shift to Convair-Ft. Worth.

Finletter pointed out that the possibility of ordering both planes into major production would complicate the production site problem. He emphasized that while the first few models of the B-52 would be produced at Seattle, major production, if undertaken, would be at an inland city (AVIATION WEEK Feb. 26). Finletter would not amplify the subject further.

▶**Big Brother to B-47**—In appearance, the Boeing XB-52 greatly resembles the six jet-engined B-47 now in production. Though somewhat smaller in size than the present Convair B-36, the XB-52 is designed to meet the same strategic bomber requirement capability of carrying 10,000 lb. 10,000 mi. Powerplants are slung two in a pod, two pods under each wing. Wings and tail are sweptback at a 35-deg. angle.

Crew complement is reported to be nine, including relief crew for long-distance missions. Design specifications of the XB-52 turbojet version give the plane a slight edge in speed over that found in the jet-engine version of the B-36.

Boeing is reported to have put a great deal of its own financing into going ahead with a semi-tooling up program, gambling that production would be ordered. This was in face of an officially announced re-examination of the long-range bomber concept early last year, and some indecision in official Air Force circles as to whether even to complete the two prototype B-52 bombers then in production.

▶**Sweptwing B-36**—Familiar configuration of the current production B-36 changes greatly in Consolidated-Vultee's sweptwing version as is indicated in AVIATION WEEK's artist conception of the plane (AVIATION WEEK Nov. 20, 1950). Overall dimensions remain substantially the same, but both wings and tail are sweptback at 35 deg. Fuselage is the same as is used in current production B-36.

Engines are slung two in a pod, two under each outer wing panel. Inner wing panels remain the same in design as the current B-36, permitting considerable savings in design and tool engineering of both wing and landing gear structure.

If enough J-57 powerplants are not available when needed for installation aboard the B-36, it is understood that a temporary switch to the General Electric J-47 engine will be made to permit flight testing of the plane as soon as possible.

Convair's top proposal is for turboprop installations in a sweptwing version, but relative progress of suitable turboprop engines is far behind the turbojets. Hence reliance for the time being is on turbojet installations for flight testing the sweptwing configuration.

Turboprop powerplants which have been discussed in connection with the Convair sweptwing B-36 are the Pratt & Whitney T-34 and the Allison T-40, both expected to develop approximately 5700 shaft hp. But it is likely that a production sweptwing B-36 would have an even newer powerplant, more powerful than either of these and not yet announced.

Design performance figures of the Convair sweptwing configuration call for a bomber capable of carrying 10,000 lb. 10,000 mi. with a top speed of 550 mph. and at an altitude of 55,000 ft. Crew complement is 11 with a relief crew of four.

▶**Canberra Visit**—Finletter also disclosed during his press conference that the Air Force had decided to buy English Electric's Canberra light jet bomber, and that it would be built by the Glenn L. Martin Co., Baltimore. This does not mean, he emphasized, that we are shelving the Martin XB-51. It is still undergoing accelerated testing and is being continued as a development plane program.

Prototype production model of the Canberra B-2 arrived in the United States two weeks ago after a record-breaking flight from England to Gander air base, Newfoundland, in 4 hr. 40 min. After a stop at Gander for engine inspection, the plane with a crew of three flew down to Andrews AFB, Md., in 2 hr. 55 min. for demonstration to the press and Pentagon members of the Senior Officers Board.

The Canberra, which Secretary Finletter has officially pronounced as the best available jet light bomber, last week was at Langley AFB, Va., in demonstration before Tactical Air Command members of the Senior Officers Board and their staff officers.

USAF has speeded its schedule for procurement of Canberra, and sent the airplane to the Glenn L. Martin Co. for study. The Martin study is aimed at speeding up pre-production planning for large quantity output of the fast and highly maneuverable plane. The shift in schedule postponed a visit to AMC headquarters, Wright-Patterson AFB, Dayton. The Canberra expected to go to AMC later, in connection with the final paper work there in issuing the production contract to Martin.

New Cutlass

Tailless twin-jet Navy fighter will have two Westinghouse J-46s.

Navy authorization for production last week took Chance Vought's high speed Cutlass jet fighter off the shelf after a three year flight testing period for the radical tailless fighter.

Chance Vought announced that Navy had authorized production of a substantial quantity of the F7U-3, a new and improved version of the Cutlass. The new version is powered with two Westinghouse J-46 engines, replacing the Westinghouse J-34 engines used in the earlier F7U-1 pre-production Cutlasses. The new powerplant installation is rated at approximately 4800-lb. thrust dry and 6000-lb. thrust with afterburner.

Since the Cutlass is described by the manufacturer as the first in the U.S. designed from the start for use of afterburners, it may be assumed that the new production version will be able to call upon 12,000-lb. thrust for short bursts of emergency power.

Three of the F7U-3 planes have already flown at the Grand Prairie, Tex. Chance Vought plant.

▶**Potentially Fastest**—At the time the first XF7U-1 made its first public flights at Patuxent, Md. (AVIATION WEEK Nov. 29, 1948) the plane was described as potentially the Navy's fastest jet, designed for any ceiling we can visualize for fighter operations, and as "perhaps the most radical departure we've ever had in a service-designed airplane."

Since the prototype sweptwing fighter was powered with two J-34s, rated at more than 3000-lb. thrust each, it is assumed that the later and more powerful models are capable of even better performance than the over 650 mph. unofficially quoted for the prototype.

Flight performances have indicated that the plane has on one of the shortest rates of turn of any U.S. high speed jet. Its short and stubby wings have a very low aspect ratio and a 38 degree sweepback. The wings, however, have a relatively large area providing a relatively low wing loading, for better maneuverability, and better handling for shipboard landings.

NATO Jets

Flow of planes abroad quickens. T-33, F-84 shipments increase.

American jet fighter planes are beginning to appear with increasing frequency in combat squadrons of the North Atlantic Treaty Organization nations and other Western Bloc allies as U. S. industry steps up aircraft production to meet U. S. Mutual Defense Assistance Program commitments.

Latest U. S. ally scheduled officially to receive jet fighter equipment under terms of MDAP is Turkey. Air Force Secretary Thomas K. Finletter reported this in his meeting last week with the press to discuss his visit to Europe and the Middle East.

Secretary Finletter praised the Turkish air force. Although small in comparison to U. S. Air Force, he said, thorough training has made it an extremely close-knit and capable fighting machine.

First increments of jet equipment to Turkey will include a small number of Lockheed T-33 two-place jet trainers. These will be used by Turkish jet pilots, now undergoing jet transitional training at Chandler AFB, Ariz., in the training of still more Turkish fighter pilots in their homeland.

The T-33 is currently powered by Allison's J-33-A-23 developing 5200-lb. thrust; has a range of 1345 mi.; service ceiling of 45,000 ft., and a speed of more than 600 mph.

▶**F-84 Standardized**—Actual fighter equipment scheduled for delivery to the Turkish Air Force will be Republic Aviation's F-84E Thunderjet which is being standardized by the United States as fighter-bomber for the NATO group.

The F-84E is currently powered by Allison's J-35-A-17 developing 5000-lb. thrust; has a range of 1100 mi. with bomb pylon tanks; service ceiling of more than 45,000 ft.; and a speed of more than 600 mph.

NATO nations which have thus far received considerable support from U. S. under terms of MDAP are France, England, Belgium and the Netherlands.

• **France**, whose industry was virtually destroyed during World War II, is scheduled to receive large quantities of U. S. aircraft and extensive technical assistance in bringing its aircraft industry back on its feet.

The first batch of Republic F-84E jet fighters was delivered to the French government about two weeks ago. The government expects to round out jet fighter equipment for six French fighter squadrons by end of calendar year 1951.

MDAP has committed USAF for delivery of more than 300 Republic F-84 fighters to European nations during the year. That figure is programmed to exceed 800 by mid-fiscal 1952.

• **Belgium.** First shipment of twenty Thunderjets for the Belgian air force arrived in that nation March 3.

Four Thunderjets were ordered to Melsbroeck Airdrome, recently, for demonstrations before the Belgian air staff and other government officials. The planes are part of USAFE's 86th Fighter Wing.

• **England** is scheduled to receive approximately 500 North American F-86 Sabre fighters during the next 18 months, with deliveries beginning sometime late this spring. The plane is scheduled to be standardized for production in western Europe as this nation's contribution to tactical air defense of NATO nations. Chances are that the export version will be powered by the Canadian Avro-Orenda jet engine which develops 6500 lb. thrust.

Great Britain already received sizeable numbers of the Boeing B-29 Superfortress bomber which it has renamed the "Washington." Presently programmed plans of NATO are that squadrons using the B-29 will convert to the all-jet Boeing B-47 after production lines in this country are sufficiently stepped up to permit export of the plane. Export plane will probably be the four-engined bomber now designated as the B-47C.

▶**Links in a Chain**—The Air Force is building a tight chain of air bases in an arc, downward across western Europe and across the Middle-Eastern perimeter of defense. In England USAF now operates from Manston, Sculthrope, Monham, Lakenheath, Mildenhall, Brize Norton, Waddington, Whyton, Bassingbourne, Burtonwood, Fairford and Upper Heyeford.

In Germany's U. S. zone of occupation, USAF operates from Weisbaden, Rhein-Main, Furstenfeldbruk, Neuberg, Landsberg, Erding and Berlin and in Austria, from Tulln Field. Across the Mediterranean USAF bases are in Tripoli and at Dhahran on the Persian Gulf.

USAF is negotiating for bases at Morocco, and five in Egypt including Deversoir, Shalafa, Fayid, Kabrit and Ismailia. It is negotiating for two additional bases one at Amman, and another at Habbaniya, Iraq. Negotiations have thus far been completed for one new air base which will be constructed on the island of Cyprus off the coast of Turkey.

Presently there are 20,000 Air Force officers and men stationed along this strategic line of air bases. Aircraft strength is estimated at about 750 combat planes of all types. Most of the bomber, cargo and utility types are of World War II vintage.

Douglas Aims to Hold Transport Leadership

Douglas Aircraft Co., whose planes hauled the bulk of World War II cargoes, is driving for the same sort of leadership in any future emergency, it is indicated in President Donald W. Douglas' annual report to stockholders.

At Santa Monica, Douglas is at work on "the largest single contract awarded to the company since 1945"—for C-124s, four-engine Air Force cargo planes. Before last July, 80 C-124s were on order. The total now is believed to exceed 150.

▶**Transport Orders**—At the same plant, Douglas is working on AF and Navy orders for 29 DC-6As, as well as a large batch of commercial DC-6As and Bs. And Santa Monica also is converting 100 Navy R4Ds (DC-3 types) into R4D-8s (Super DC-3s).

Most important transport right now to Douglas, and probably to the Air Force, is the big C-124. First production plane was delivered last April, a month ahead of schedule. Since then, a full squadron of C-124s (12) has gone into service. Because of C-124 deliveries, the company's airframe weight output in 1950 rose to more than 7.2 million lb. (as against 5.5 million the preceding year) although the number of planes delivered dropped from 289 to 246.

▶**Combat Craft**—Despite its fast-growing transport business, Douglas continues as a major source of Navy combat aircraft. Its AD Skyraider series, first designed in 1944, will continue in production for at least two years more. The company has production orders on the turboprop A2D, and the F3D jet night fighter. And both Douglas and the Navy have high hopes for the recently announced XF4D jet interceptor which the annual report for the first time publicly terms "supersonic."

In common with other manufacturers now reporting, Douglas shows swelling backlog ($656,362,000 at the end of the fiscal year, Nov. 30), sales and profits. Sales for the year totaled $129,893,000, as opposed to $117,422,000 in the preceding year, and profit after taxes was $7,214,000 compared to $5,517,000 reported the previous year (AVIATION WEEK Mar. 5).

As part and parcel of the initial stages of a production step-up, Douglas as well as other manufacturers, report rising inventories, lowered cash and small growth in working capital. Douglas' cash dropped sharply from $37.5 million to $20.5 million, while inventories were rising proportionately, from $23.3 million to $40.2 million.

Consequently, as a hedge against large cash demands, Douglas has arranged for credit from five banks.

FINANCIAL

Subsidy Shapes Air France Course

A plane for a franc sounds good, but carrier cannot build replacement reserve if it has no depreciation.

While not on the agenda of the bilateral air transport discussions now in progress between France and the United States in Paris, the question of subsidies will influence ultimate determinations.

Pan American World Airways encountered stiff opposition from the French when it sought to serve Paris under the terms of its acquisition of American Overseas Airlines. This entry was permitted only after many months of negotiation and strong diplomatic representations. With TWA, PAA is now the second U. S. carrier serving Paris.

▶**Competition Feared**—The French are fearful of the competitive consequences exerted on their own national airline, Air France. Moreover, with Pan American flying Stratocruisers alongside Air France's Constellations, the French are apprehensive that they will be at a further disadvantage on this prize trans-Atlantic route.

This factor led the French to limit frequencies of service of American airlines to France and it remains a key issue underlying the current bilateral discussions.

In a broad sense the philosophies of private enterprise and state nationalism are in conflict as this issue is being resolved. Air France, an instrument of national policy of the French, is heavily subsidized by its government. This is a practice followed by all European countries in supporting their individual international air carriers. This subsidy support shapes the nature of airline operations and competitive practices of the European carriers and is strongly evident in the case of Air France.

The large element of subsidy presents the anomaly of being both the cause of Air France's competitive disadvantages as well as raising artificial barriers seeking to protect it from American inroads.

The avenues and full extent of Air France's subsidized support, along with that of other foreign carriers, remain among the best-kept international secrets. While our own companies publish complete and detailed accounts of their operations, their foreign counterparts do not.

The main financial prop of Air France remains virtual assurance of complete financial support from its government. This is done by providing the necessary capital through stock or loans and, when necessary, guaranteeing securities issued to the public. But this is not all. The extent of indirect aid is substantial and appears in various guises. For all practical purposes, Air France is 100-percent state-owned. All operating deficiencies are reimbursed by the government treasury.

▶**A Franc A Plane**—In 1946, the government acquired 40 Langueducs, twin-engine transports of French manufacture, and turned them over to Air France at a cost of one franc each. A total of five Latecoere seaplanes were also acquired by Air France in the same manner at one franc each. The 13 Lockheed Constellations in service were obtained through ECA funds.

At first glance, acquiring all of this equipment without any cost would appear to place Air France at a tremendous competitive advantage. But whatever initial gain was achieved was soon lost.

In the first place, the planes of French manufacture were not really desired by the airline but were built to help encourage a government aircraft industry and Air France was a seemingly natural outlet. Of greater consequence is the failure of Air France to develop replacement reserves for aircraft equipment as depreciation can hardly be charged against airplanes "purchased" at one franc each. It is this lack of resources normally accumulated through depreciation charges that has proved embarrassing to Air France and is an important element motivating the French to erect protective barriers around its airline.

Nevertheless, the French government is continuing the financing of other transport types, the Armagnac and the Breguet 761. Presumably, these planes may be turned over to Air France as were the Langueducs and Latecoeres.

▶**The American Way**—By contrast, American carriers do not have the same compulsion to accept the product of any aircraft plant, unless they feel it meets their particular requirements. It is this free play of economic forces which not only encourages technological advances but makes mandatory sound business practices for the airline operator. This includes the sale of service at a profit and with operating expenses including the necessary provision for depreciation, thus developing replacement resources.

Another form of indirect aid rendered Air France by its government is the avoidance of losses on foreign exchange in blocked sterling or "soft" currency area. The airline merely turns over such currency to the French embassy for local utilization in the country involved, receiving credit in full.

The development of Air France follows the succession of earlier French airline enterprises with a predominant undertone of heavy subsidization. As of Dec. 31, 1949, the capital stock of Air France amounted to 10 billion francs (350 francs equal $1.00). This entire capital was provided by the government. In addition it had long-term debt of 4,134,763,143 francs as of that date, also advanced by the government and largely representing counterpart funds obtained through ECA financing.

Air France is buying four more Constellations, scheduled for delivery in August of this year. In this instance, the purchase is being financed by a five-year credit extended by French banks but guaranteed by the government. It is significant that in the total ECA grants to all countries, France obtained more than half, some $47.2 million, largely for Air France.

▶**Various Subsidies**—Direct subsidies are very large in operating Air France, but not easily defined. For the period from Sept. 1, 1948, to Dec. 31, 1949, direct grants amounted to 2.6 billion francs. This, however, is not all. There are various agreements with separate ministries which add to the revenues of the airline. Under certain route operations to the French colonial empire in North Africa, for example, the company is assured of a definite volume of business by contract.

Our international airlines receive their government support through U. S. mail payments. They do not obtain the indirect aid and grants so peculiar to their counterparts in Europe.

U. S. mail subsidies in the international field appear to be very small relative to the collective aid obtained by Air France and the other foreign international airlines.

The current situation surrounding the bilateral discussions in France also highlights the fact that an airline, once entrenched in heavily subsidized operations, is forced to seek an increasing measure of government support. Nor can a government, once committed, afford to have its instrument of national air policy fail. This begets more controls and artificial restrictions designed to protect its entity. This approach clashes with the American concept of free enterprise which has pushed commercial aviation throughout the world to its most advanced state of development.

—Selig Altschul

More time for creative drafting!

Look at just two of the ways Kodagraph Autopositive Paper saves valuable drafting time for the Cleveland Crane and Engineering Company.

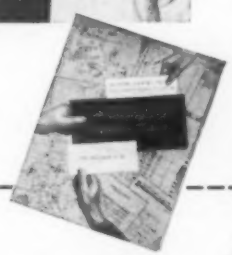
The chances are you'll be able to take similar short-cuts in your work . . . *turn hours of costly retracing time into hours of creative drafting time.*

1 Time saved . . . when drawings must be combined

Many clients order custom jobs requiring electrical components which Cleveland Crane must obtain from outside vendors. Oftentimes, the designs for several of these units must be combined in one drawing before original drafting can begin. This used to be a tedious retracing job—*but no longer.* Now, desired sections of the vendors' prints are reproduced as a composite print on "Autopositive" Paper. Exposure is in a direct-process machine; processing is in standard photographic solutions. The result is a sparkling positive intermediate . . . with dense photographic black lines on a clean, evenly translucent base. On it, the draftsman simply adds the necessary wiring detail . . . producing a new "master" in a fraction of the old time.

2 Time saved . . . when drawings must be changed

New design must replace old detail on complicated switch assembly drawings. *And Cleveland Crane is doing the job the easy way:* instead of making a new drawing—which would be 85% retracing—they reproduce the original one on Kodagraph Autopositive Paper. Then the draftsman removes the unwanted lines from the intermediate print with corrector fluid . . . and draws in the new detail. Result: a brand-new "original" is ready in three hours instead of 3 days. *Ready* to produce sharp, legible shop prints in the desired number.



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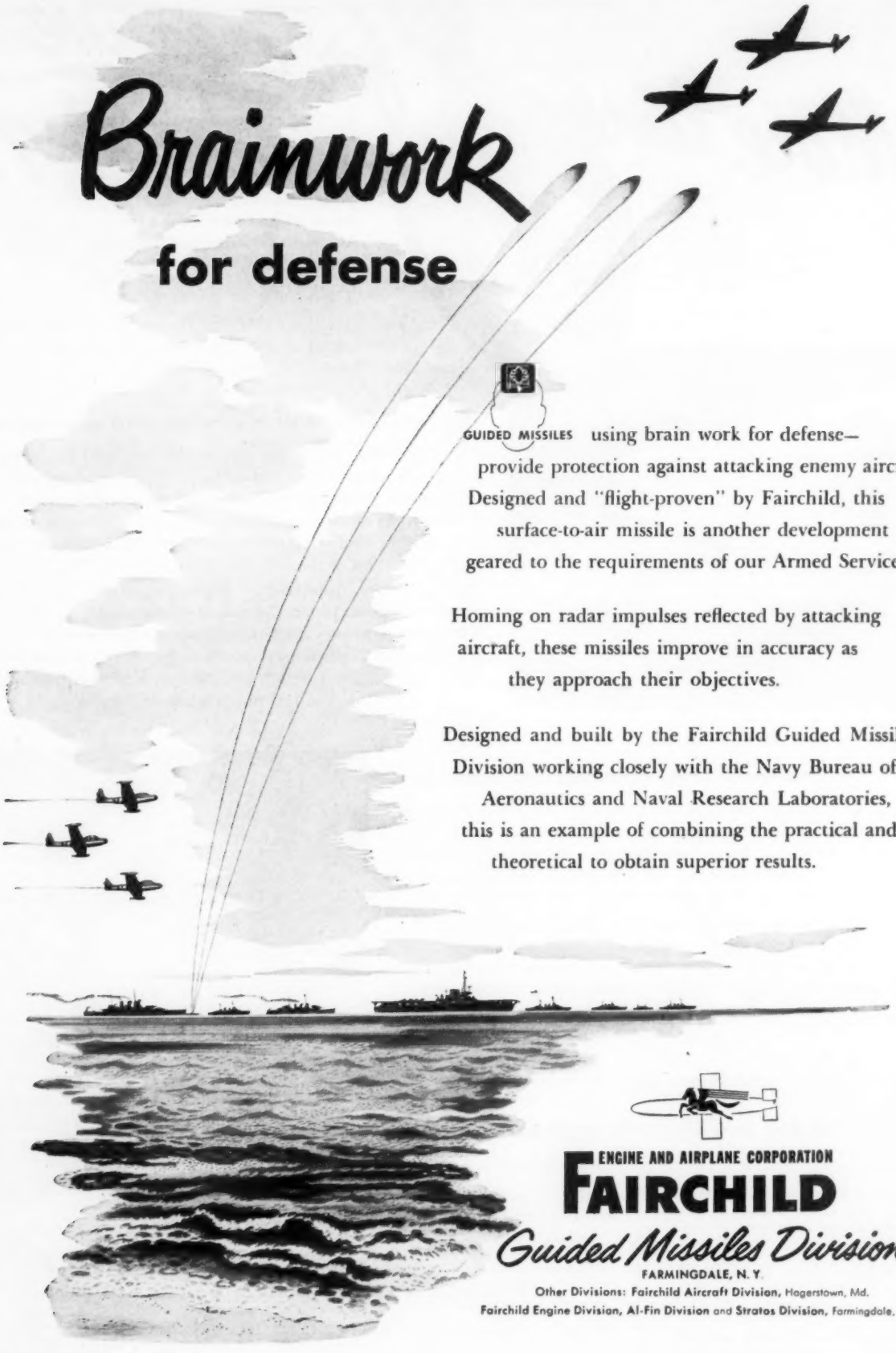
TRADE-MARK

Brainwork for defense



GUIDED MISSILES using brain work for defense—provide protection against attacking enemy aircraft. Designed and "flight-proven" by Fairchild, this surface-to-air missile is another development geared to the requirements of our Armed Services.

Homing on radar impulses reflected by attacking aircraft, these missiles improve in accuracy as they approach their objectives.

Designed and built by the Fairchild Guided Missiles Division working closely with the Navy Bureau of Aeronautics and Naval Research Laboratories, this is an example of combining the practical and theoretical to obtain superior results.

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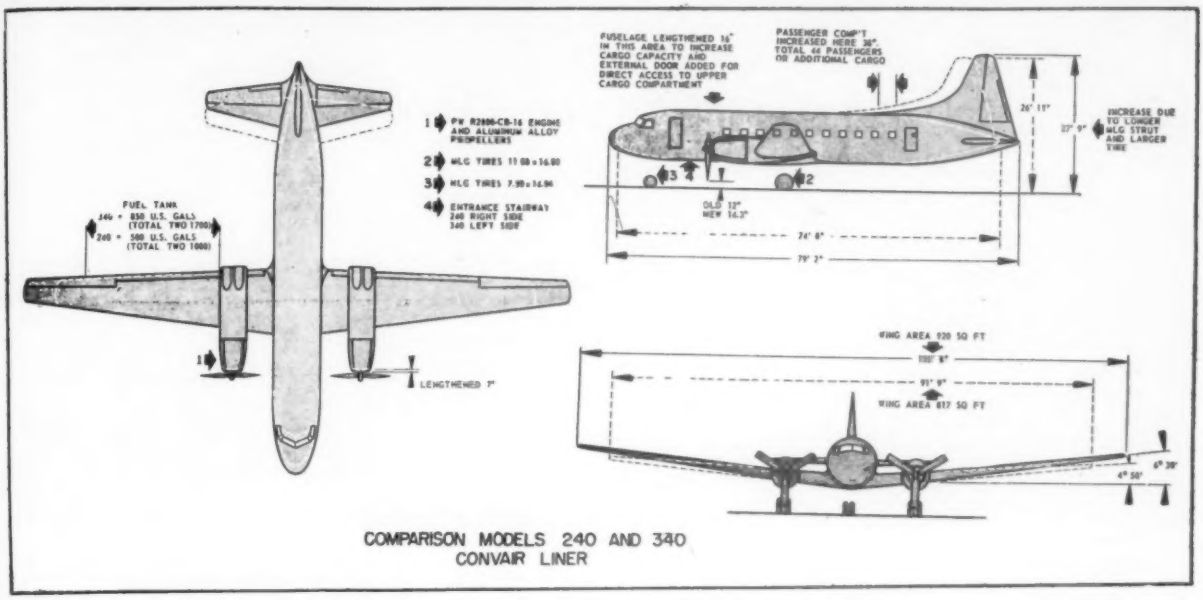

FUSELAGE LENGTHENED 16" IN THIS AREA TO INCREASE CARGO CAPACITY AND EXTERNAL DOOR ADDED FOR DIRECT ACCESS TO UPPER CARGO COMPARTMENT
PASSENGER COMP'T INCREASED HERE 38". TOTAL 44 PASSENGERS OR ADDITIONAL CARGO
INCREASE DUE TO LONGER MLG STRUT AND LARGER TIRE
FUEL TANK
LENGTHENED 7"
WING AREA 920 SQ FT
WING AREA 817 SQ FT

COMPARISON MODELS 240 AND 340
CONVAIR LINER

Convair Triplets: 240, Turboliner, 340

Well-proven 240 developed into turboprop and piston powered 340. Advances possible with 501 engines.

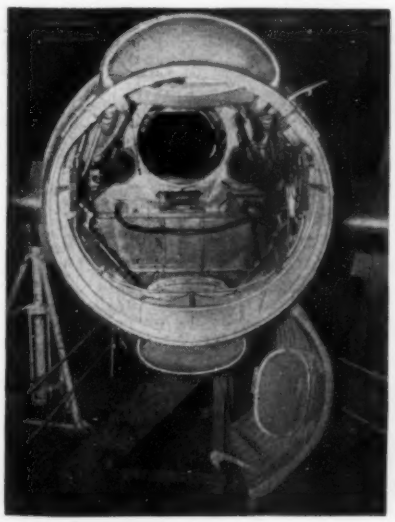
Turboprop transport research is being pushed by Consolidated Vultee Aircraft Corp. and Allison and Aeroproducts divisions of General Motors Corp. as a team.

Basic vehicle is the Convair-Liner. Powerplant is the Allison 501-A4 (T-38) turboprop equipped with Aeroproducts propeller. Result of the combination is the Turboliner. The accompanying photos show installation details of the engine and propeller on this plane.

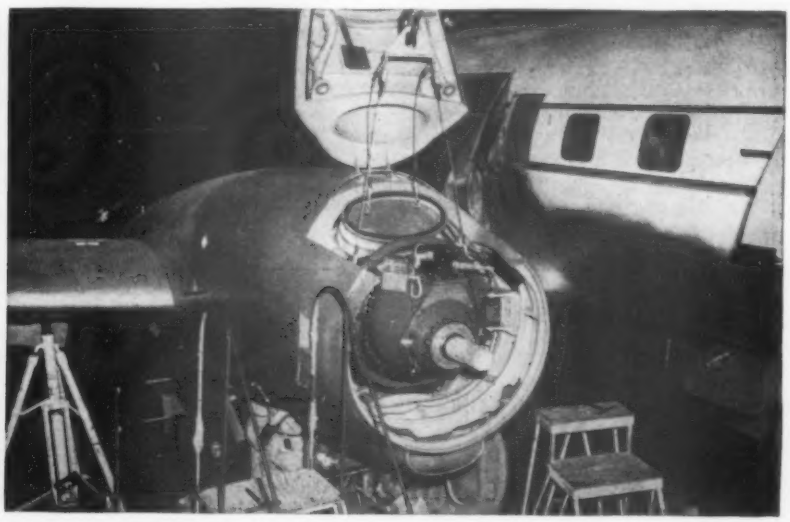
▶**Data for Industry**—Schedule for the Turboliner includes 30 hours of flight test by Convair followed by experimental flight trials by Allison at Indianapolis, where extensive service runs will be made in order to evaluate turboprop transport operating conditions.

The data gathered by Allison will be made available to Convair and later the plane is scheduled to perform as a demonstrator for the military, the aircraft manufacturers and airline operators. It may also be used for airline regular route cargo haulage to supply answers for the operators and airframe builders.

▶**Turboprops Anticipated**—Meanwhile, Convair has gone ahead with an improved version of the Convair-Liner,



TURBOLINER nacelle bears three engine mounts, one aft and two forward at sides.



ALLISON TURBOPROP gets air through scoop in nacelle top, oil cooler air through scoop at nacelle bottom. All fluid, electrical, control lines have quick-disconnects.

Convair-Liner 340 Specification details

Performance

Gross weight	45,000 lb.
Maximum payload	11,632 lb.
Fuel capacity	1,700 gal.
Average cruising airspeed @ 16,000 ft.. (1200bhp/eng.) (demonstration weight 43,000 lb.)	280 mph.
Range with 200 mi. plus ¾ hr. fuel reserve: (1200 bhp./eng.) (10 mph. headwind) (44 pass. and baggage) (fuel, 812 gal.)	545 st. mi.
Maximum CAR operating altitude with one engine inoperative (max. continuous power) (demonstration weight 43,000 lb.) (rate of climb = .023 V_{e0}^2)	9900 ft.
Required CAR runway length for take-off with 45,000 lbs. at SL (wet rating 2400 bhp./eng.)	4020 ft.
Required CAR Runway Length for Landing, sea level, at Maximum Landing Weight of 44,500 lb.	4250 ft.

Weights

Weight empty	29,486 lb.
Max. landing gross	44,500 lb.
Max. takeoff gross	45,000 lb.
Max. zero fuel	43,000 lb.
Max. takeoff wing loading	48.9 lb./sq. ft.
Max. takeoff power loading	9.38 lb./bhp.

Dimensions

Wing Group:	
Wing Area	920 sq. ft.
Span	105 ft. 8 in.
Root chord	13 ft. 6 in.
Tip chord	4 ft. 6 in.
Taper ratio	3:1
Incidence root	4 deg.
Aspect ratio	12
Mean aerodynamic chord (true)	9 ft. 6.3 in.
Body Group:	
Max. fuselage cross-section	
Height	9 ft. 5 in.
Width	9 ft. 5 in.
Length	79 ft. 2 in.
Height over tail (3-point position)	27 ft. 9 in.
Tread, main wheels	25 ft.

Engines: Two P&W, 18-cyl., R-2800-CB-16s, two speeds, fuel Grade 100/130

Horsepower Ratings	Torquemeter Power per Engine (bhp.)	Critical Altitude (ft.)	Engine Speed (rpm.)
Takeoff wet	2400	4000	2800
Takeoff dry	2050	6000	2700
Takeoff dry (alt.)	1950	8000	2800
Max. Continuous:			
Low blower	1800	8500	2600
High blower	1700	14,500	2600

Propellers:
Hamilton Standard Hydromatic:
3 blades, automatic full-feathering and reversible.
Diameter ..... 13 ft. 1 in.

Turboliner Performance

	Present	Advanced
Take-Off Gross Weight (lb)	41,790	45,000
Fuel Capacity (gal)	1,530	1,530
High-Speed, Normal Pwr (mph)	349 @ 26,000'	381 @ 27,000'
Max Altitude to Meet CAR One-Engine Take-Off Climb, Take-Off Gross Wt, Rate of Climb=.035V_{s1}^2, Take-Off Pwr (ft)	6,800	.....
Max. CAR Operating Altitude with One Engine Inoperative, Rate of Climb=.02+V_{s0}^2, Normal Pwr, Take-Off Gross Wt (ft)	10,100	14,000
Required CAR Runway Length for Take-Off at Sea Level, Take-Off Pwr (ft)	4,080	4,030
Required CAR Runway Length for Landing at Destination at Sea Level, Maximum Landing Wt=42,200 lb (ft)	*3,900	*3,900
Stall Speed at Sea Level at Maximum Landing Wt, Full Flap (mph)	93	93

*Propellers Reversed for Ground Run.

Weight Breakdown For Convair-Liner 240-A (Early version of 340)

With Advanced 501 Engines

Takeoff Gross Weight		45,000
*Mfrs Dry Weight Empty		26,657
System Fuel		53
System Oil		60
Certificated Wet Weight Empty		26,770
Crew		
Pilots (2)	340	
Stewardess	130	
Baggage	75	
Total		545
Flight Deck Equipment		60
Wash Water and Chemicals		80
Cabin Equipment		82
Food Container and Service		200
Food and Liquids		127
Oil (usable)		150
Operating Weight Empty		28,014
Reserve Fuel		2,770
Operating Weight Empty plus Reserve Fuel		30,784
Maximum Landing Weight		42,857
Maximum Payload, Weight Limited		11,416

*Includes weight allowance for pressure of 5.5 psi. and design cruise speed (V_c) of 325 mph.

designated the 340, which, though designed to use Pratt & Whitney CB series piston engines, is specifically intended to accommodate turboprop powerplants with a minimum of modification.

Convair reports that the 340 has been designed, aerodynamically and structurally, with ample allowance for all anticipated increases in turboprop power.

Thus, philosophy behind the Convair-Liner 340 design is that when turboprop engines are available in this country for commercial use, airlines operating the plane will be able to switch to turbine-propeller power with little trouble and expense.

▶ **340 Features**—Latest report gives these details for the 340:

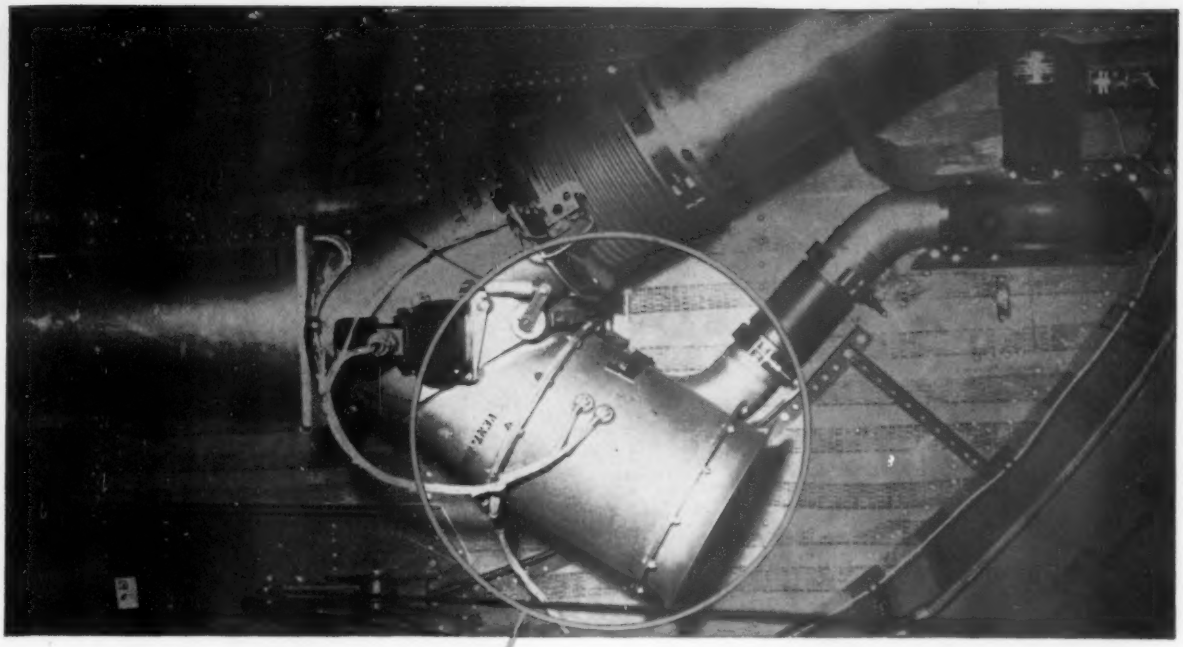
The craft's 105 ft. 8 in. wingspan boosts the wing area to 920 sq. ft. from the 817 sq. ft. in the 240 wing, an increase of almost 13 percent. This added wing area, plus the advantages of the new flap system, should give the 340 better ability to operate from the smaller-size airports.

It is stated that the new wing's greater area in panels outboard of the engine nacelles, combined with an aspect ratio increased from 12 to 10 (on the 240) allows gross takeoff weight to be boosted 3200 lb. over the 240's 41,790 lb.

Approximately 2000 lb. more payload is expected to be toted for the same range as the 240, at higher cruising speeds.

Added wing area raises the integral fuel tank capacity 150 gal. over that of the latest 240 version, to give a total of 1700 gal.

Fuselage has the same diameter as the



JOY AXIVANE® AIRCRAFT FANS

warm airborne troops before take-off

To protect our airborne troops in frigid areas before take-off, Joy AXIVANE Aircraft Fans are installed in these huge troop-carriers to blow heated air into the main cabin while the plane is on the ground. Ram effect is utilized for this purpose after the carrier is airborne. Air from the fan is mixed with a metered stream of air from the heater to provide the desired air temperature in the duct. Thus, cold weather is no hindrance to the fast, efficient transportation of our fighting men to any theatre.

This highly-efficient 1.5 H.P. fan produces 1100 C.F.M. at 5.5" static pressure, yet weighs only 22 pounds and is only 9" in diameter. A & N design specifications. Superior features of all Joy Aircraft Fans are compact design, shock-resistant strength, minimum operating noise, and the most favorable air volume-to-weight and electric-to-air power ratios.

W&DA3440

● Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom-engineered for highest efficiency. For many purposes stock fans can be supplied from the extensive line already designed. Both single and two-stage units available. Optional features include straight or flared inlets, beaded or flanged connections, radio noise-filters, anodization, and cooled motors where required.

★ ★ ★ ★ ★

Here are some of the many uses for Joy AXIVANE Aircraft Fans: Windshield de-frosting, windshield or wing de-icing, cabin heating, cabin ventilating, cockpit heating, cooling radio and electronic equipment, cooling voltage regulators, oil cooling, gear-box cooling, instrument cooling, air recirculation, and high-altitude pressurizer boosting.

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1. OUTSTANDING PERFORMANCE—Strength and toughness, resistance to wear, fatigue or shock to meet a wide range of requirements, as dictated by design.
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3. ECONOMY—resulting from standard compositions precisely graded to match the engineers' needs.

Service records established by triple-alloy steels over a period of years show that they are giving excellent results in many diverse and exacting applications.

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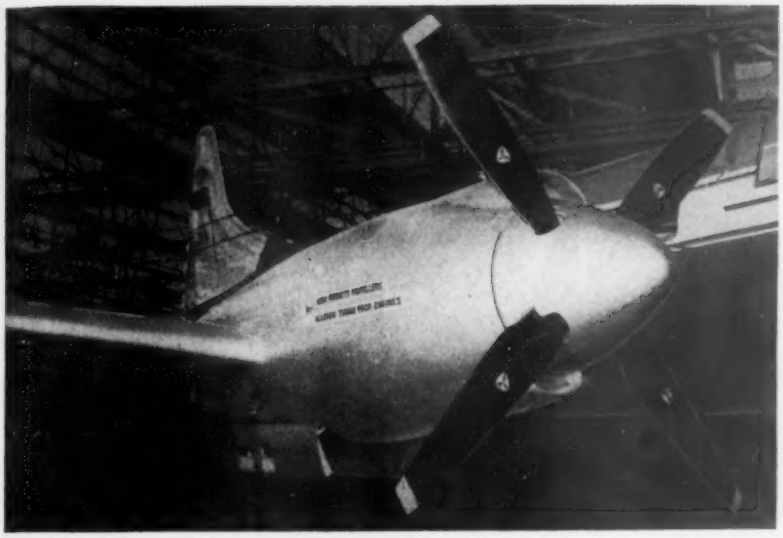
Because of their many advantages, these triple-alloy steels warrant your careful consideration when planning new or improved designs. We shall be glad to furnish counsel and data upon request.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

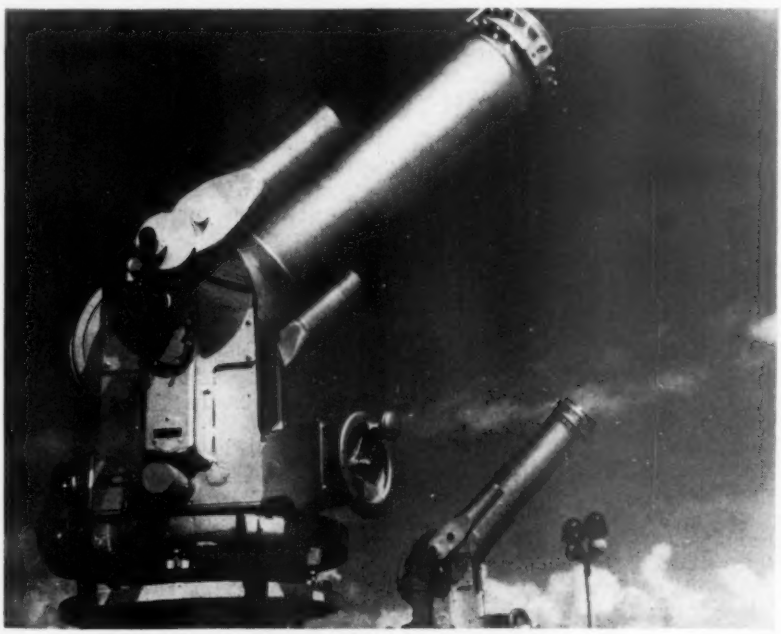


TURBOLINER'S PROP enters spinner through cutouts permitting blade pitch change from full feather to reverse. Air scoop on nacelle top is held with two latches.

240 (9 ft. 5 in.). Length is 79 ft. 2 in. This is 54 in. more than the 240's and is distributed in cylindrical sections for 38 in. aft of the wing and 16 in. forward. This extra space allows 4 additional seats for a total of 44 passengers, or it can be used for cargo storage.

The 340's pressurization and air-conditioning system will include a new type engine-driven supercharger with two-speed operation. Air conditioning during ground operation also will be possible.

The accompanying tabulation gives performance data for the Turboliner as presently constituted (with 501 Allison turboprop engines) and estimated performance for the plane with advanced 501s, together with a weight breakdown for an early version (240-A) of the Convair-Liner 340 with advanced 501 engines. Weight figures for the 340 with 501s should be comparable.



MISSILE FLIGHT SCANNERS

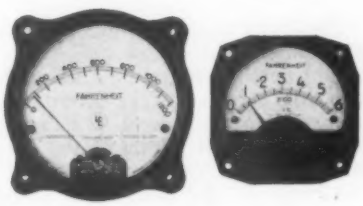
These optical trackers—huge theodolites—pinpoint streaking rocket missiles to get a photographic record of the test flight. The devices are manually operated and are used by the General Electric Co. at the AF long-range proving grounds, Cocoa, Fla.

LEWIS
Indicating Pyrometers

for temperature testing in the laboratory or in the plane...

Constructed with the same care as our aircraft temperature indicators, these pyrometers bring "aircraft quality" to the test engineer.

MODEL 58PY, above, has been used extensively by leading motor car manufacturers for road testing on the "Proving Grounds" — where performance counts. Housed in rectangular bakelite case, has 6" hand drawn scale and is fully compensated for ambient temperature. Made in ranges listed below, with suitable thermocouple materials.



MODEL 23B, left above, has same type movement as our aircraft pyrometers. Housed in flanged, 4" round, bakelite case for panel mounting.

MODEL 20B, right above, has same 3" steel case and same movement as our aircraft panel indicators. Both are fully cold-end compensated and available in standard ranges listed, with suitable thermocouple materials.

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FAHRENHEIT

Zero to 400, 600, 800, 1000, 1200, 1600, 1800, 2000 and 2500.

CENTIGRADE

Zero to 200, 300, 400, 500, 600, 800, 1000, 1100 and 1400.

Furnished with white scales, black markings and pointer or, with black scales white markings and pointer if specified. For best results use LEWIS Thermocouples, Leads and Selector Switches with these instruments.

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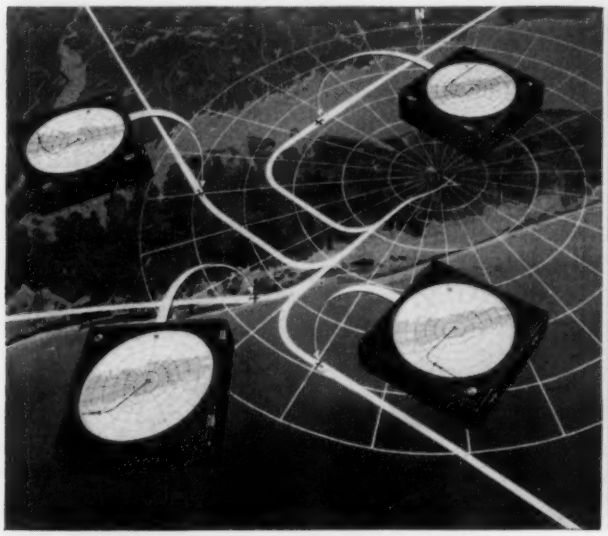
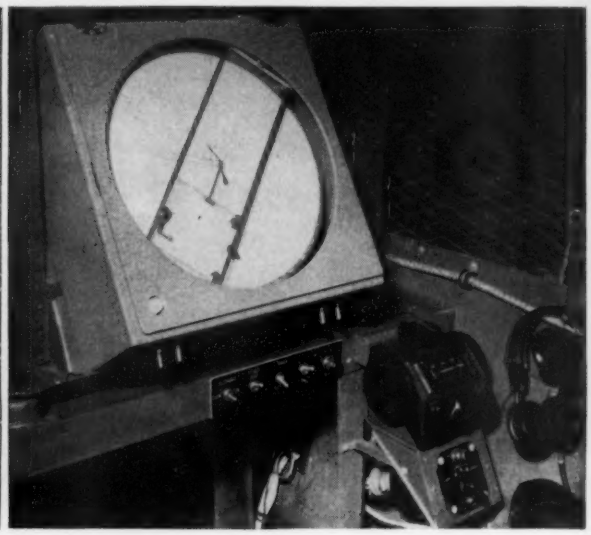


HOW MAP indicator shows omni-DME data of microwave system.



REMOTE control station in C-54 for navigation system tests.

Air Force Tests New Navigation System

All-Weather Flying Division begins flight studies for ANDB on Sperry 5000mc. Rho-Theta system.

Details of a new navigation system for control of dense air traffic within airport terminal areas were disclosed by two radio engineers of the Sperry Gyroscope Co. at the recent 19th annual meeting of the Institute of the Aeronautical Sciences in New York City.

George B. Litchford and Joseph Lyman, who one year ago described the microwave omnirange which forms the basis of the new omni-bearing-distance system (AVIATION WEEK, Feb. 20, 1950), reported these developments:

• **Basic system,** installed recently at Wright-Patterson AFB, is being flight tested under the Air Navigation Development Board's navigation aids evaluation program by USAF All-Weather Flying Division.

• **A new kind** of distance measuring equipment, based on phase measurement principle, forms an integral part of the 5000-mc. omnirange.

• **Cockpit instrumentation,** in addition to the usual omni and distance indicators, consists of a graphic computer display which plots the airplane's position and ground track by facsimile method on a map representing the terminal area.

• **DME,** in addition to other facilities included in the system, uses same ground transmitter, aircraft receiver, and radio channel employed by omnirange.

►**Evaluation Program**—Basic system, part of a series of Sperry air navigation projects in the 5000mc. frequency band sponsored under AF contracts since 1946, has been placed under cognizance of ANDB's Navigation Aids Evaluation Center supervised by the All-Weather Flying Division.

The USAF-Sperry navigation system, along with a 5000mc. landing system, is designated a "common system" project by the Research and Development Board. It is one of several developments, which began originally under AF sponsorship, being considered in ANDB's "ultimate program" for the common system.

According to ANDB, "substantially all evaluation projects of a navigation nature" will be conducted by All-Weather Flying Division at Wright-Patterson AFB.

All-Weather's job is to determine which, if any, of the many aids being created in the electronics industry are suitable for development into the ultimate network of the common civil-military system of air navigation.

No matter how promising a new navigation aid may seem during its early development, it must pass its flight examinations at All-Weather before it can be considered by ANDB as candidate for the ultimate system.

►**Design Objectives**—The new navigation system is intended as a foundation upon which a coordinated control system for air traffic can be built. Ultimate goal of its designers is to provide a traffic control system which not only is adequate for eliminating traffic jams around major air terminals and critical AF bases, but is also capable of being expanded to meet future demands of an air transport industry which is growing faster each year.

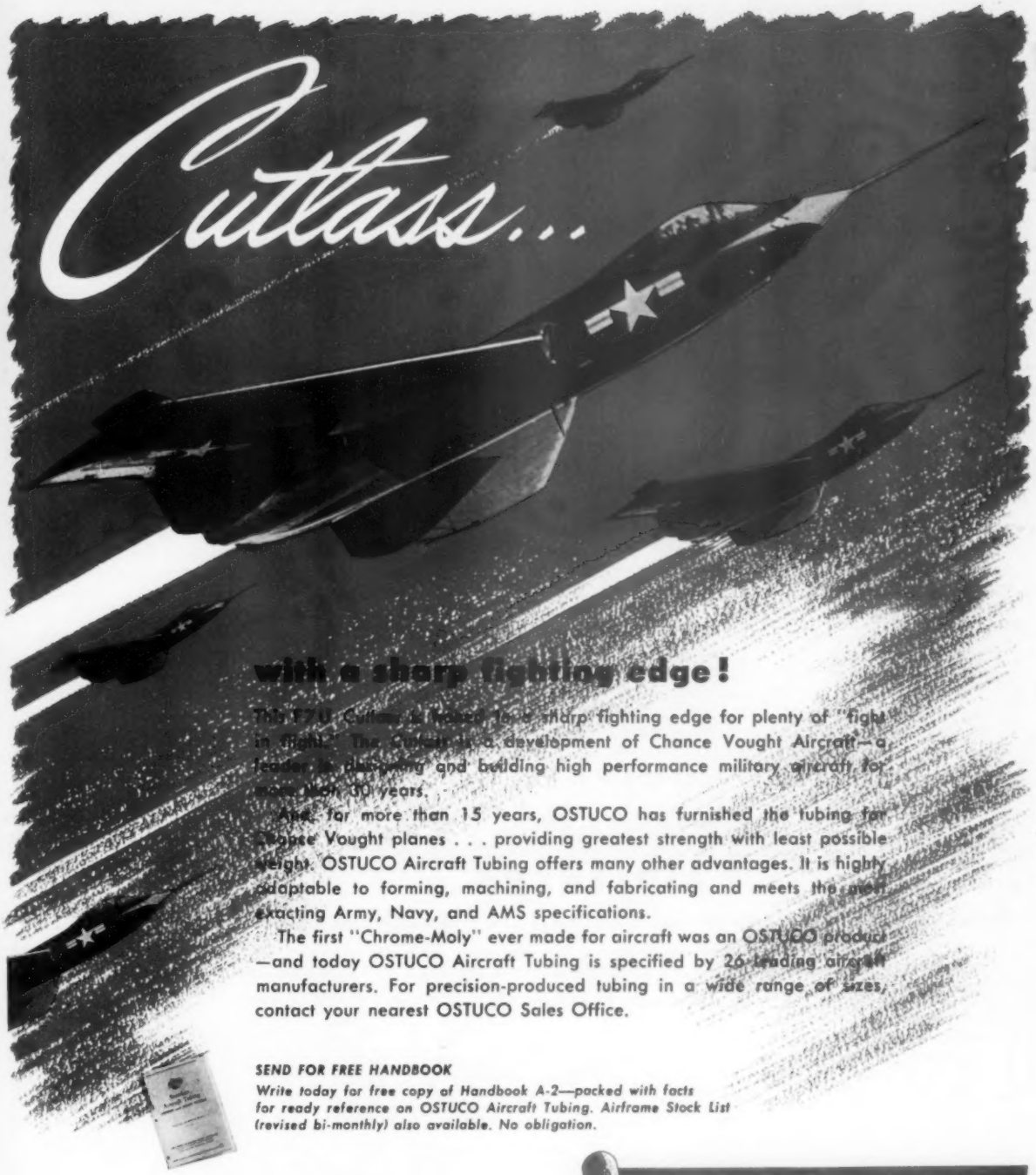
Principal design objectives of the system are:

• **Conservation of equipment.** Development of system components is carried out concurrently so that they can be built into each other.

• **Conservation of frequency spectrum.** Putting all system facilities in the same frequency band (5000mc.) permits separate components to use the same radio channels. Use of continuous-wave emission makes narrow band channels possible.

• **Accuracy.** Lyman and Litchford emphasize accuracy as a primary operational requirement that any terminal area navigation system must meet if it is not to limit the flow of air traffic.

Most exacting requirement for accuracy is the spacing of aircraft on final approach. For example, if it is desired to land aircraft approaching at 120 mph. at 30-sec. intervals over a 10-mi. common approach track, Lyman and Litchford's calculations show that a ground speed accuracy of ±2-mph.



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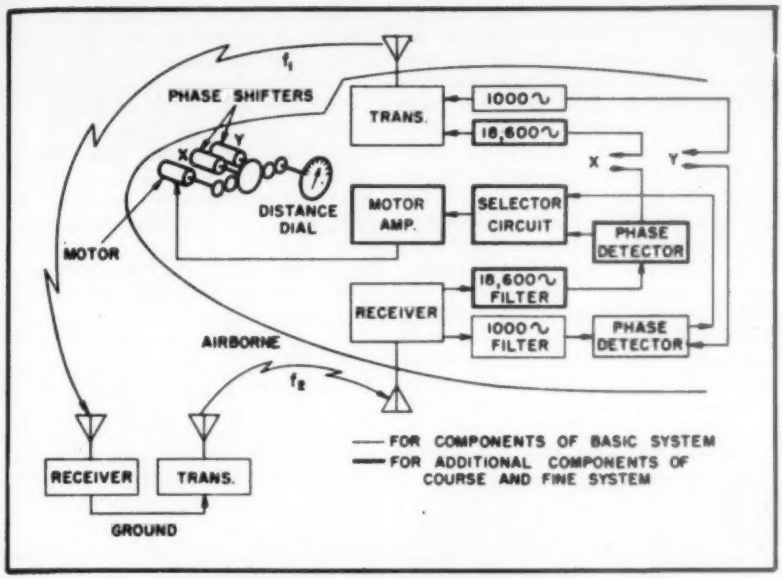

BASIC coarse and fine distance measuring system.

would permit the separation of aircraft to get as low as eight seconds at the touchdown.

A ±2-mph. ground speed accuracy requires ±250-ft. accuracy in distance measurements. If the ground speed accuracy is increased to ±1-mph. in an effort to allow sufficient time for corrective action, and if this measurement is to be made in 15 sec., distance must be measured to an accuracy of ±25-ft.

▶**New DME Technique**—The microwave DME employs a new technique for measuring distance with radio waves. Most existing types of radio systems—radar, loran, 1000mc. DME—which employ distance measurement, measure the transit time of radio pulses to determine the distance. In contrast, the new system uses the phase difference between transmitted and received continuous tone modulation.

This phase difference between the transmitted and received signals is proportional to distance to the ground station.

In the instance of an airplane 93 mi. from the ground station, a constant 1000-cycle tone transmitted to the ground station and returned to the airplane produces a phase difference of exactly 1 cycle, or 360 deg. At this distance, or 9.3 mi., the phase difference is 36 deg.

Magnitude of the phase difference also depends upon the tone frequency used.

An 18,600-cycle tone will produce a 1-cycle difference for every 5 mi. the aircraft traverses away from the ground station.

Lyman and Litchford use both frequencies in their system. The 1000-cycle tone provides a coarse measurement of distance while the 18,600-cycle tone serves as a fine vernier or decade measurement.

The coarse-fine system promises high accuracy. If it is possible to measure phase differences to ±3 degrees as Lyman and Litchford point out, the

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theoretical accuracy can then be good to ±220 ft.

The inventors explained that a third decade of measurement can be added "without complicating the system much over the single-frequency system," since almost all equipment needed for a three-frequency system is available in the two-frequency system. "Thus, an increase in accuracy to almost anything required operationally can be achieved, including the extremely high accuracy required for final approach," they said.

▶ **Multiple Aircraft Use**—Added to the new DME technique is a scheme which makes the system capable of handling large numbers of aircraft. The phase difference technique without further development would limit use of the system to only a few aircraft. Several aircraft transmitting a continuous tone signal simultaneously on the same frequency channel would jam each other and make the system unusable.

This problem is overcome by scheduled time sharing of aircraft transmissions. All aircraft share the same frequency channel at scheduled intervals. In practice, each airplane occupies the radio channel for only 1/60 sec. once in every 6 sec.

Transmission time is scheduled in proportion to each airplane's azimuth position as determined by the omnirange. An airplane east of the station determines its distance 1.5 sec. after a plane north of the station uses the system. A plane south uses the system 3 sec. after the plane at north.

This scheme makes 300 separate time intervals available in the system. During each interval, each airplane can make 310 consecutive measurements of its distance. Rate of change of distance can be established by the system after four or five of these measurement intervals.

Capacity of the system is further improved by such factors as rate memory. If a distance measurement is missed, a circuit in the system remembers the rate of change of distance and advances the servos according to the established rate.

The rate memory will cover missed measurements for as much as 30 sec. The system "will not saturate under the highest possible utilization rate," according to Lyman and Litchford.

▶ **Pilot's Indicator**—Distance and bearing from the navigation system are presented to the pilot on the airplane on a map indicator. The indicator works as a graphic computer which permits the pilot to fly any required combination of straight and curve tracks in the terminal area.

The indicator is considered by its designers to be a form of integrated indication because it combines several pieces of information into a single picture and solves at a glance many of the piloting and navigation problems that have kept pilots busy calculating mentally since the time airplanes first began to fly.

Besides plotting bearing and distance of position on the map, the indicator also shows magnetic heading, ground track, drift, track deviation, and position relative to landmarks and other fixes in the area. It also provides a sense of ground speed, linear speed, and turning speed on the flight path. More important, the pilot can see what maneuvering problems are coming up on his flight path.

Map, printed on facsimile paper, covers a 30-mi. area around the ground station. Distance and omni data from the navigation system move an electric stylus or bug on the map. The stylus, which represents the airplane and its position in the area, automatically travels over the map as the airplane maneuvers in space. As the stylus moves, it records by facsimile process the airplane's ground track on the map.

The required flight track, instructing the pilot where to fly, can also be shown on the map. From the stylus and the track it records, the pilot can see his airplane's deviation from the required flight track, his drift angle, and the heading of the plane relative to the track. The designers said that the stylus will show track deviations as small as a few hundred feet in the 30-mi. area.

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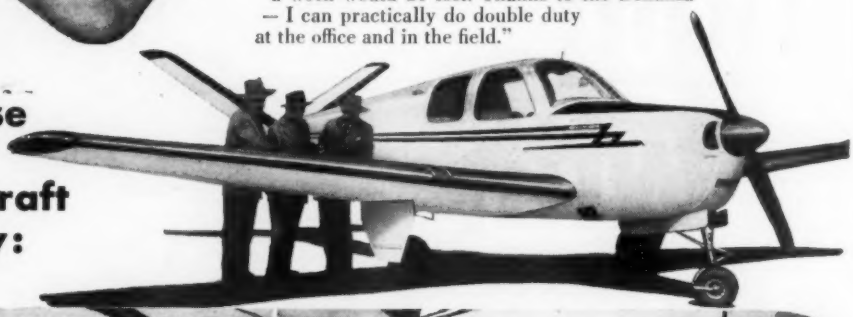
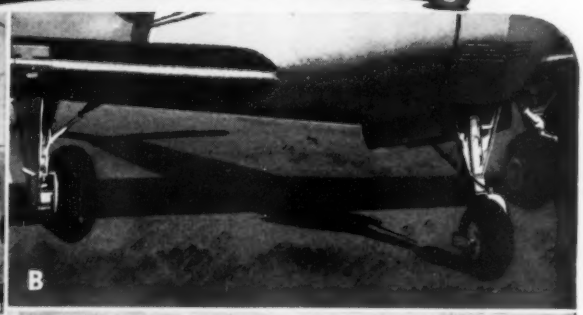
The Whayne Supply Co. operates a huge road machinery business, with branches in Evansville, Indiana; Ashland and Paducah, Kentucky, so plenty of field trips are needed. "The Bonanza is a marvelous engineering achievement — completely dependable, rugged, and fast. I make this trip to all three branches and am away from Louisville only one night. By other means of transportation a week would be lost. Thanks to the Bonanza — I can practically do double duty at the office and in the field."

Check these reasons for Beechcraft superiority:





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PRODUCTION

OPEN BINS hold parts for assemblers, seen working on F-89 cockpit floor section.

Put Parts Where They're Needed

That's Northrop's way, and the Scorpion manufacturer has found it saves lots of production time, money.

An easy reach is paying off on Northrop Aircraft, Inc.'s F-89 Scorpion production line.

Pinpoint spotting of parts for assemblers has given a "one-step" line stocking system that already has shown economies as high as 17 percent over the conventional stockroom method in six months of operation. Indications are that with stepped-up Scorpion production, an additional 25-percent saving may be achieved.

▶**Production Study**—Northrop determined that each Scorpion would require about 30,000 fabricated, purchased and government-furnished parts. To work out a plan to get this material into the hands of the assemblers with the least possible delay when it was needed, a Northrop team of production, industrial engineering, accounting, material and plant engineering personnel pooled ideas with manufacturing control representatives.

The combine came up with a scheme to abolish stockroom handling and apply a line stocking system in gradual stages as F-89 production started to roll.

▶**One Step**—Philosophy behind the new system is that the assembler won't have to take more than a single step to pick up the next part. Of course, on large assemblies this doesn't always work out, but transfer space has been cut to a minimum.

Racks and parts bins have been installed along the final assembly line in the major component assembly departments and in subassembly as close as possible to the related operations.

And areas previously used for stockrooms have been freed for production activities.

▶**Special Racks, Routing**—Racks are of uniform construction, finish and color. Special units hold odd-shaped, easily damaged parts, such as hydraulic tubing, skin, contoured forms and ducts.

In nearly all cases, bins and racks are installed in "lost" space adjacent to jigs and assembly stations.

Fabricated parts are routed directly to subassembly. Subassemblies are fed directly to the assembly line. Purchased parts and government-furnished equipment travel directly from warehouses to the subassembly shop or to the production line.

▶**Shortage Control**—A manufacturing control representative staffs each production area, stocking parts in the racks and reporting shortages.

Routine of assembling shortage reports has been greatly simplified. Because control-point personnel are aware of shortages by daily observation of assembly parts lists, lack of parts or material are identified well in advance of need. Thus, it is a simple matter to isolate critical shortages from parts merely delayed in fabrication or delivery.

As a result, expediters are able to devote their total effort toward elimination of critical shortages. And with the line stocking system, shortage reports have become concise and effective in contrast to the traditional bulky impractical report resembling bills of material.

▶**On-the-Spot Posting**—Assembly parts lists formerly used for stockroom operation are posted at each parts rack. A diagonal pencil mark opposite the part number indicates that the part has been placed in the rack.

The production leadman "keeps his own books." He merely drawns a diagonal mark in the opposite direction when the part is withdrawn.

When surges in fabrication or subassembly create an overstocked condition with some items, they are held in dispersal areas temporarily, but number of these areas have been held at a minimum.

▶**System Experience**—As personnel gain experience in the line stocking system, they can take on a larger number of parts racks gradually, to increase the man-hour savings.

For example, in one department three control points were established originally and kept busy servicing production. As the personnel became more familiar with conditions it was found that one control point could be eliminated by dividing its responsibilities among the other two.

▶**Storage Neater**—And Northrop reports that better housekeeping results when parts are stocked in the open. Parts hidden on stockroom shelves often are stored in a sloppy manner.

Valuable parts, particularly government-furnished items, are stored in locked cabinets, leadmen and manufacturing control personnel having the keys.

Northrop says that loss of parts has remained at a minimum, appearing no greater than would occur under stockroom operation.

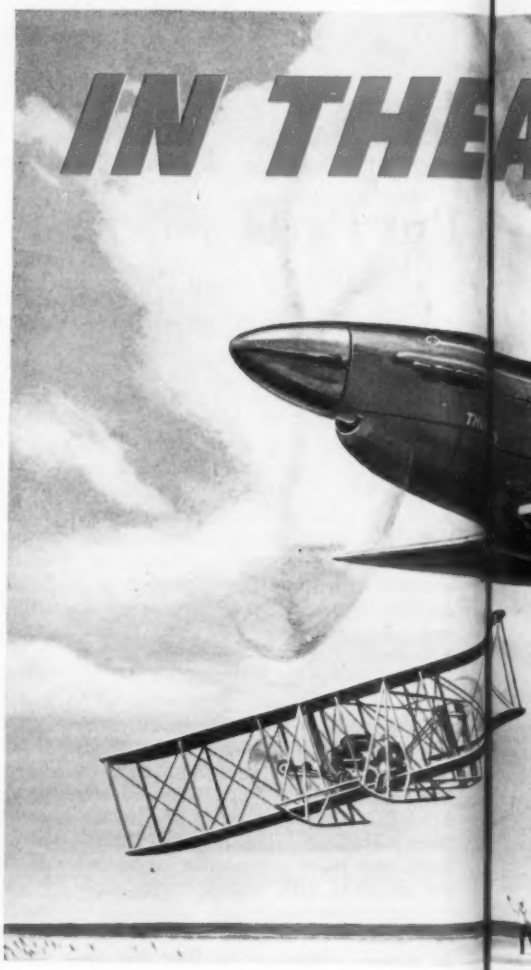
▶**Moves Easier**—The new system also facilitates operational moves. Recently, when Northrop moved its wing assembly line over the weekend from one building to another, fully loaded parts racks were transferred with the jigs, fixtures and partially completed assemblies. Assemblers reporting to the new location on Monday morning were able to take up where they had left off the previous Friday.

Northrop has found that line stocking has paid off in reduced costs and increased production efficiencies.

Aeroquip Expands

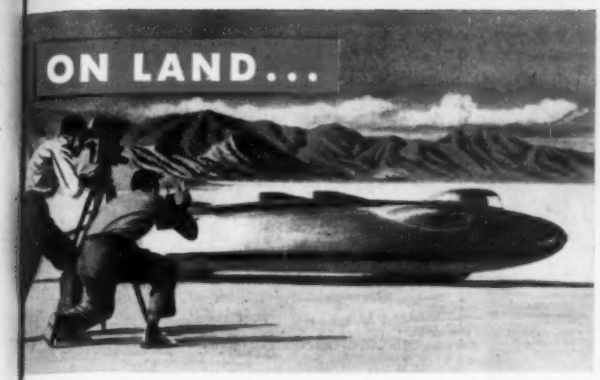
Orders are piling us so fast at Aeroquip Corp., Jackson, Mich.—backlog well in excess of $6 million compared with about $1 million early in 1950—that the company is adding about

FIRST



Why Accept Anything Less?

Mobi



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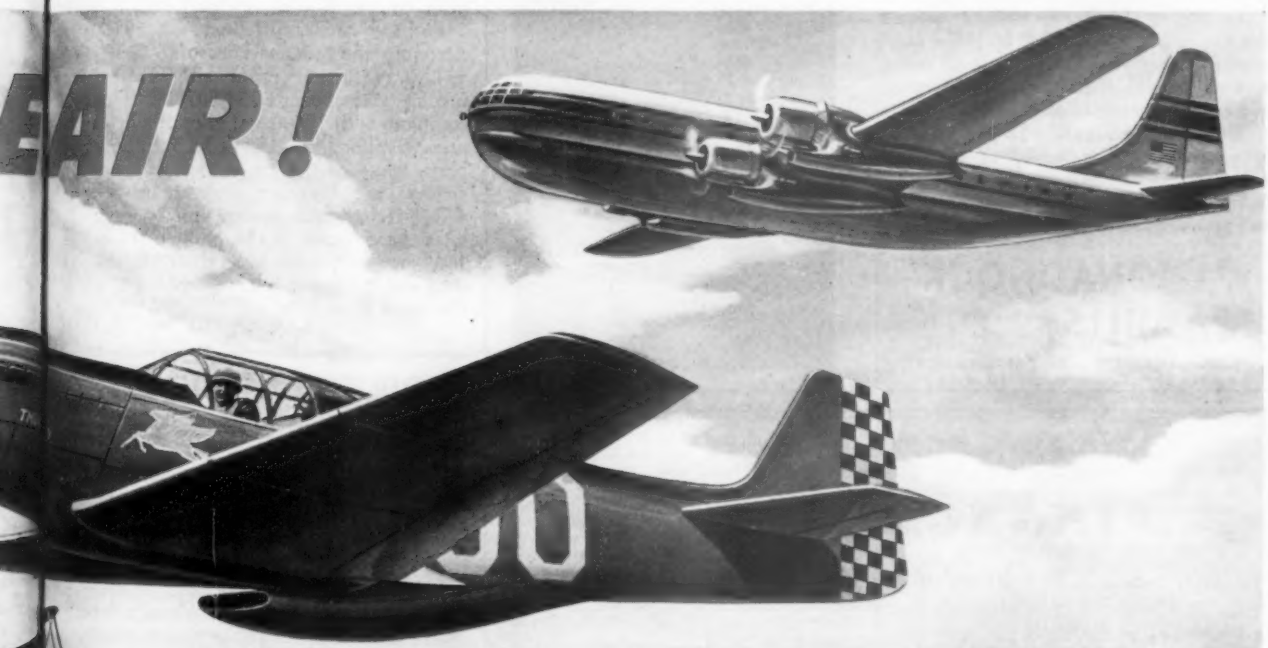

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65,000 sq. ft. to its main plant at a cost of about a half-million dollars and is putting up a new 25,000-sq. ft. building costing a quarter million for its West Coast subsidiary, Aero-Coupling.

This is only the beginning, because the stepped-up plane production program won't be felt until later this year. Much of the business increase is credited to the demothballing program, which has involved refitting the planes with Aeroquip hose lines; the fact that World War II surplus stocks of the hose fitting are no longer available; development of new applications for the firm's products, and change in customer buying habits. (Customers are now operating with an average lead time of 90-120 days, compared with 30 days or less prior to the Korean outbreak.)

For the year ended Sept. 30, 1950, Aeroquip showed net sales of $7,035,491.70, with net profit after federal income taxes being $734,507.95. This compares with 1949's net sales of a little over $6 million and 1948's $3.5 million-plus. Some of the production efficiencies of the firm are evident in the added fact that its average hourly wage rates have more than doubled since 1941, material costs have risen 70 percent and it has cut prices 38 percent in the same period.

PRODUCTION BRIEFING

► **Security Parachute Co.**, Oakland Municipal Airport, is converting from civilian to military production and will open a factory in downtown Oakland as it did in the last war.

► **Rohr Aircraft Corp.**'s recent $4-million order from Lockheed Aircraft for Super Connie power packages brings its backlog to $45 million. Employment is up to 3300. During World War II it hit 9800.

► **Airwork Corp.** has completed negotiations with All-American Airways for overhaul and conversion of 60-70 P&W R-1830-92 engines annually.

► **Standard-Thomson Corp.**, Dayton, automotive and aviation parts marker, plans to put up a new $1.5-million plant facility near the municipal airport. It will provide 180,000-200,000 sq. ft. of floor space.

► **Lockheed Aircraft Service** has been awarded a contract by Aerovias Brazil for major overhaul of three DC-4s to 8000-hr. overhaul specifications, and to do fuel tank stripping and resealing and replacement of Curtiss-Wright 9HD engines with P&W R-2000-11s. LAS-International is to overhaul a second Avianca DC-4, including modifications.

Negotiated Contracts

This listing completes the publication of Air Force negotiated contracts announced for the week ended Feb. 9. Total awards for the period were nearly $70 million. Other contracts for the period were published in AVIATION WEEK Mar. 5.

Southern Weaving Co., Greenville, S. C., webbing, Cl. 21, $58,320.

Sperti Faraday, Inc., Cincinnati, control-projector release, Cl. 11B, $35,480.

Sperry Gyroscope, Sperry Corp., Great Neck, L. I., N. Y., airborne ignition engine analyzers, Cl. 05D, $618,000; analyzers, Cl. 17C, $87,510.

Standard Molding Corp., Dayton, flashlights, Cl. 08A, $61,521.

Standard Rolling Mills, Inc., Brooklyn, N. Y., reflectors, Cl. 16A, $58,056.

Struther's Dunn, Inc., Philadelphia, deport ratchet relay, Cl. 16E, $50,000.

Sundstrand Machine Tool Co., Rockford, Ill., constant speed drives, Cl. 03C, $310,000.

Surface Combustion Corp., Toledo, heaters, engine and shelter, Cl. 19A, $1,316,778.

Thomas A. Edison, Inc., West Orange, N. J., fire detection kits, Cl. 03C, $415,757.

Transducer Corp., Boston, trainer, radar, Cl. 28D, $3,905,000.

Trinity Oxygen Co., Ft. Worth, breathing oxygen, Cl. 06B, $26,170.

Tube Distributors Co., Inc., Brooklyn, N. Y., steel tubing, Cl. 23A, $132,670.

Tubing Seal Corp., Inc., Los Angeles, aircraft hardware, Cl. 04A, $25,077.

Turco Products, Inc., Los Angeles, paint remover, Cl. 07, $49,290.

United Mfg. Co., Chicago, soft zinc-coated steel wire, Cl. 23A, $200,970.

United States Gauge div. of American Chain & Metals, Inc., Sellersville, Pa., torque-pressure transmitters, Cl. 05D, $75,182.

United States Steel Co., Cincinnati, steel angle and plate, Cl. 25A, $640,109.

Varo Mfg. Co., Garland, Tex., static converters, Cl. 03C, $75,000.

Vendo Co., Kansas City, Mo., components of radar set, Cl. 16A, $25,354.

Weatherhead Co., Cleveland, aircraft hose, Cl. 04B, $26,805.

Welded Construction Engr. Co., Cleveland, spare parts for propeller dolly, Cl. 19E, $35,281.

Westinghouse Electric Co., Dayton, transformers, $209,075; aircraft hardware, Cl. 04A, $26,550.

Weston Electrical Instrument Corp., Newark, N. J., voltmeters, Cl. 03C, $86,000; indictators, temperature, Cl. 05D, $54,600.

White Tuning Corp., New York, adapter, phase, Cl. 05C, $30,000.

Whiting Corp., Harvey, Ill., nacelle stand assemblies, Cl. 19A, $112,102.

Wm. R. Whittaker Co., Ltd., Los Angeles, valve assemblies, fuel, Cl. 031, $34,237.

Wyandotte Chemical Corp., Los Angeles, paint remover, Cl. 07, $64,448.

AF Invitations

Bid openings are 20-30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number.

One bid set will be available for examination without obligation by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bids sets.

Procurement field office locations: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Longo Aves., Detroit 32; 155 W. Washington Blvd., Los Angeles; 67 Broad St., N. Y. 4.

INVITATIONS

Resistors, 1-6 items, bid invitation No. 51-1464, issue date 16 Feb., delivery complete within 90 days.

Dolly assemblies, 1074 each, bid invitation No. 51-1465, issue date 16 Feb., delivery starting within 60 days, complete within 210 days.

Adapter assemblies, 1-5 items, bid invitation No. 51-1466, issue date 16 Feb., delivery within 120 days after date of award.

Screws, 1-75 items, bid invitation No. 51-1467, issue date 16 Feb., delivery starting within 30 days, complete within 120 days.

Grommets, 1-5 items, bid invitation No. 51-1468, issue date 16 Feb., delivery starting within 30 days, complete within 90 days.

Leather, 1-8 items, bid invitation No. 51-1469, issue date 16 Feb., delivery starting within 60 days, complete within 120 days.

Nails, 1-34 items, bid invitation No. 51-1460, issue date 15 Feb., delivery starting within 30 days, complete within 120 days.

Tanks, 1-4 items, bid invitation No. 51-1462, issue date 15 Feb., delivery maximum for Items 1 & 2 within 210 days, Items 3 & 4 within 150 days.

Chain, 1-3 items, bid invitation No. 51-1454, issue date 12 Feb., delivery 25 percent within 30 days, 25 percent within 60 days, 25 percent within 90 days and 25 percent within 120 days.

Resistors, 1-6 items, bid invitation No. 51-1455, issue date 12 Feb., delivery within 100 days.

Dolly and cradle assemblies, 1-2 items, bid invitation No. 51-1456, issue date 12 Feb., delivery starting within 75 days.

Buckets-mop wringing attachment, 25,000 each, bid invitation No. 51-1446, issue date 12 Feb., delivery starting within 30 days, complete within 120 days.

Screws, 1-11 items, bid invitation No. 51-1449, issue date 12 Feb., delivery starting within 30 days, complete within 120 days.

Airplane mooring kits, 1-2 items, bid invitation No. 51-1450, issue date 12 Feb., delivery starting within 45 days, complete within five (5) months.

Buffing compound, 1-2 items, bid invitation No. 51-1451, issue date 12 Feb., delivery starting within 30 days, complete within 120 days.

Cotter pins, 1-41 items, bid invitation No. 51-1452, issue date 12 Feb., delivery starting within 30 days, complete within 120 days.

Brushes, 1-27 items, bid invitation No. 51-1453, issue date 12 Feb., delivery starting within 30 days, complete within 120 days.

Gun, paint spray, 1-6 items, bid invitation No. 51-1494, issue date 23 Feb., delivery starting within 60 days, complete within 90 days after date of Award.

Gun, oil 1-4 items, bid invitation No. 51-1484, issue date 23 Feb., delivery starting within 30 days, complete within 90 days after date of Award.

Rubber Parts...

NEW CATALOG CONTAINS DATA ON COMPOUNDS, APPLICATIONS AND FABRICATION METHODS

This 16-page, illustrated, multi-colored catalog now is available to design, production, purchasing and management personnel. This publication has been compiled to familiarize readers with Stalwart-developed rubber compounds which feature resistance to (1) abrasion, (2) chemicals, (3) high and low temperatures, (4) petroleum products and derivatives, and (5) weathering. Sections of the catalog are devoted to the new and outstanding Silicone Rubber compounds, the major methods of fabrication, and Stalwart production facilities.

More than 60 Stalwart-developed compounds are listed by code number. Charted individually in conjunction with these compounds are their physical properties and general characteristics, as well as suggested applications.

Catalog 51SR-1 will be sent upon receipt of coupon or on letterhead request.

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Old Country & Glen Cove Roads, Mineola, N. Y.

Imperial Hway. & Sepulveda Blvd., Los Angeles Calif.

Gun, metal spray, 1-2 items, bid invitation No. 51-1485, issue date 23 Feb., delivery starting within 60 days, complete within 90 days.

Tapping machine, 1-2 items, bid invitation No. 51-1486, issue date 23 Feb., delivery complete within 60 days after date of Award.

Flaring tube machine, 1-9 items, bid invitation No. 51-1488, issue date 23 Feb., delivery starting within 90 days, complete within 150 days.

Scales, 1-21 items, bid invitation No. 51-1471, issue date 16 Feb., delivery beginning within 90 days, complete within 120 days after date of Award.

Step ladders, 1-4 items, bid invitation No. 51-1472, issue date 16 Feb., delivery within 30 days after date of Award.

Punch press, 1-7 items, bid invitation No. 51-1473, issue date 16 Feb., delivery starting within 60 days, complete within 180 days after date of Award.

Bar assemblies, 126 each, bid invitation No. 51-1474, issue date 16 Feb., delivery within 120 days after date of Award.

Screws, 1-75 items, bid invitation No. 51-1476, issue date 19 Feb., delivery starting within 30 days, complete within 120 days.

Bit-screwdriver, 1-14 items, bid invitation No. 51-1477, issue date 19 Feb., delivery beginning within 90 days, complete within 120 days.

Cotton thread, 1-8 items, bid invitation No. 51-1478, issue date 19 Feb., delivery starting within 60 days, complete within 120 days.

Grinders, 1-11 items, bid invitation No. 51-1483, issue date 19 Feb., delivery starting within 60 days, complete within 150 days after date of Award.

Testers, 15 each, bid invitation No. 51-1470, issue date 16 Feb., delivery within 60 days after date of Award.

USAF Awards

Air Material Command Procurement Division makes available to AVIATION WEEK recent bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPPSX72.

ABSTRACTS

For mercurial barometers (51-1010):
Ideal Laboratory Tool & Supply Co., Cheyenne, Wyo., on a bid of $19,780.

For 250,001 gallons paint remover (51-395):
Companies sharing: Moran Paint Co., Dayton, on a bid of $252,341.48; Wyandotte Chemicals Corp., Wyandotte, Mich., on a bid of $7791; Turco Products, Inc., Los Angeles, on a bid of $49,290, and Wyandotte Chemicals Corp., Pacific div., Los Angeles, on a bid of $64,448.

For lamp assemblies (51-439):
Companies sharing: Pittsburgh Plated Products Co., Pittsburgh, on a bid of $8275.20; C. F. Pease Co., Chicago, on a bid of $20,922.40; Sun Ray Photo Co., Inc., New York, on a bid of $4279.75; J. G. Saltzman, Inc., New York, on a bid of $4557.10, and Compco Corp., Chicago, on a bid of $11,943.75.

For 1,500,000 pounds wiping cloth (51-442):
Companies sharing: Sanatex Corp., Chicago, on a bid of $47,220; Clemente Waste Products Co., Bronx, N. Y., on a bid of $22,470; Grossman & Sons, Inc., Columbus, O., on a bid of $24,000; Leshner Corp., Hamilton, O., on a bid of $49,000, and Long Island Waste Co., Inc., Brooklyn, on a bid of $194,600.

For aluminum rod (51-695):
Bohn Aluminum & Brass Corp., Detroit, on a bid of $5357.10.

For aircraft hardware (51-697):
Companies sharing: Aero Supply Mfg. Co., Inc., Corry, Pa., on a bid of $1041.75; Aircraft Hardware Mfg. Co., Inc., Bronx, N. Y., on a bid of $2700; Geo. W. Gayle & Son, Frankfort, Ky., on a bid of $1987.50; Aero Bolt & Screw Co., Inc., New York, on a bid of $18,500; D & H Precision Tool Co., East Orange, N. J., on a bid of $765; Air Associates Inc., Teterboro, on a bid of $1645, and Lieb Hardware Corp., Brooklyn, on a bid of $792.50.

For driers (51-710):
Morse Instrument Co., Hudson, O., on a bid of $97,427.32.

For jacks (51-731):
Steel Products Engineering Co., Springfield, O., on a bid of $64,894.50.

For connector-receptacle (51-771):
Companies sharing: Cannon Electric Development Co., div. Cannon Mfg. Corp., Los Angeles, on a bid of $10,518.40; Howard B. Jones div., Cinch Mfg. Corp., Chicago, on a bid of $2038; H. H. Buggie & Co., Toledo, on a bid of $1740, and Winchester Electronics, Inc., Glenbrook, Conn., on a bid of $2260.

For connector-receptacle (51-813):
Companies sharing: Kings Electronics Co., Inc., Brooklyn, on a bid of $8575; General Electric Supply Corp., Dayton, on a bid of $3385.65; Continental Electronics, Ltd., Brooklyn, on a bid of $8860, and Westinghouse Electric Supply Co., Dayton, on a bid of $3588.

For jackets, trousers (51-815):
Companies sharing: A. Pritzkers & Sons, Inc., Boston, on a bid of $196,409; Reed Products Inc., Milwaukee, on a bid of $218,700, and Tru-Fit Trousers, Traverse City, Mich., on a bid of $162,200.

For call contract for photographic material (51-521):
Crescent Film Laboratories, Inc., Chicago, on a bid of $25,000.

For switchboards (51-603):
Allis Chalmers Mfg. Co., Milwaukee, on a bid of $16,741, not to exceed $18,415.10.

For magazine aircraft camera (51-600):
Chicago Aerial Survey Co., Chicago, on a bid of $161,480.

For antenna assemblies (51-620):
E. F. Johnson Co., Waseca, Minn., on a bid of $26,438.40.

For 15,000 vinylite containers (51-908):
Prepac, Inc., New York, on a bid of $3900.

For indicators (51-1224):
Weston Electrical Instrument Corp., Newark, N. J., on a bid of $54,500.60.

For recorders (51-1135):
Companies sharing: White Tuning Corp., New York, on a bid of $5564.80; Piqua Engineering, Inc., Piqua, O., on a bid of $32,287.50, and Frederick Hart & Co., Inc., Poughkeepsie, N. Y., on a bid of $48,966.90.

For cotton gray tape (51-1129):
Companies sharing: Arbeka Webbing Co., Pawtucket, R. I., on a bid of $6648, and Churchill Mfg. Co., Inc., Lowell, Mass., on a bid of $4100.

For steering and towing assemblies (51-1039):
Companies sharing: Kuhlman Electric Co., Bay City, Mich., on a bid of $2214, and The American-Coleman Co., Omaha, Neb., on a bid of $2224.76.

For terminals (51-1161):
Companies sharing: General Electric Supply Corp., Dayton, on a bid of $3072.97; Aircraft-Marine Products Inc., Harrisburg, Pa., on a bid of $966.76; Hatheway Mfg. Co., Bridgeport, Conn., on a bid of $7394.40, and Midway Electric Supply Co., Inc., New York, on a bid of $9111.90.

For oxygen, gas, dehydrating and testing (51-1029):
Companies sharing: National Cylinder Gas Co., Chicago, on a bid of $21,006.70; Burdett Oxygen Co. of Cleveland, Inc., Cleveland, on a bid of $59,113.80; Linde Air Products Co., New York, on a bid of $334,951.50; Air Reduction Sales Co., div. of Air Reduction Co., Inc., New York, on a bid of $5904; Dye Oxygen Co. Inc., Phoenix, Ariz., on a bid of $22,136.40; Western Oxygen Inc., Odessa, Tex., on a bid of $1546.80; Trinity Oxygen Co., Ft. Worth, Tex., on a bid of $26,170.50; Air Reduction Pacific Co., div. of Air Reduction Co., Inc., San Francisco, on a bid of $69,127.20; West Texas Oxygen Co., Lubbock, Tex., on a bid of $13,921.20; Southern Oxygen Co., Inc., Washington, D. C., on a bid of $17,577; Air Reduction Magnolia Co., div. of Air Reduction Co., Inc., Houston, Tex., on a bid of $63,735, and Industrial Air Products Co., Portland, Ore., on a bid of $59,076.70.

For saws (51-821):
Companies sharing: Martindale Electric Co., Cleveland, on a bid of $685; Circular Tool Co., Providence, R. I., on a bid of $1300; E. C. Atkins & Co., Indianapolis, on a bid of $14,520; Ohlen-Bishop Mfg. Co., Columbus, O., on a bid of $2610, and Armstrong-Blum Mfg. Co., Chicago, on a bid of $15,885.

For die, dimpling (51-818):
Flight Mechanical Laboratories, Inc., Long Island City, N. Y., on a bid of $28,310.

For 2404 cases (51-449):
United States Truck Co., Fall River, Mass., on a bid of $53,969.80.

For steel (51-299):
Companies sharing: Harnischfeger Corp., Milwaukee, on a bid of $31,500; Arcos Corp., Philadelphia, on a bid of $13,200, and Burdett Oxygen Co. of Cleveland, Inc., Cleveland, on a bid of $30,925.

For 13,000 box, bomb (51,672):
Soreng Mfg. Co., Schiller Park, Ill., on a bid of $23,608.

For cap-connectors (51-669):
Companies sharing: American Phenolic Corp., Chicago, on a bid of $1808.78; Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of $183.50; U. S. Radio & Television Supplies, Inc., Chicago, on a bid of $1222; Kings Electronics Co., Inc., Brooklyn, N. Y., on a bid of $5715; Westinghouse Electric Supply Co., Dayton, on a bid of $2605.20; Gold Seal Electric Supply Co., Philadelphia, on a bid of $210.60, and Continental Electronics, Ltd., Brooklyn, N. Y., on a bid of $6550.

For connectors (51-817):
Companies sharing: Graybar Electric Co., Inc., Dayton, on a bid of $2846.20; Continental Electronics, Ltd., Brooklyn, N. Y., on a bid of $14,580; U. S. Radio & Television Supplies Inc., Chicago, on a bid of $246; American Phenolic Corp., Chicago, on a bid of $3492; Westinghouse Electric Supply Co., Dayton, on a bid of $11,573.80; Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of $1079, and Aircraft Radio Corp., Boonton, N. J., on a bid of $96.

For vibrations absorber (51-907):
Companies sharing: Harris Products Co., Cleveland, on a bid of $98,402.50, and Air Associates Inc., Teterboro, N. J., on a bid of $464.

For connectors (51-1004):
Companies sharing: General Electric Supply Corp., Dayton, on a bid of $11,317.80; Peerless Radio Dist., Inc., Jamaica, N. Y., on a bid of $251; General Radio Co., Cambridge, Mass., on a bid of $1356; Cannon Electric Development Co., Los Angeles, on a bid of $3748, and Empire Electronics Co., Inc., Paterson, N. J., on a bid of $12,150.

For bridge Wheatstone port (51-1014):
Industrial Instrument, Inc., Jersey City, N. J., on a bid of $19,501.35.

For drill press (51-1114):
Companies sharing: Famco Machine Co., Racine, Wis., on a bid of $4884; Cincinnati Lathe & Tool Co., Oakley, Cincinnati, on a bid of $507.65, and Motch & Merryweather Machinery Co., Cleveland, on a bid of $11,325.60.

For connectors (51-1140):
Wyandotte Chemicals Corp., Wyandotte, Mich., on a bid of $21,286.50.

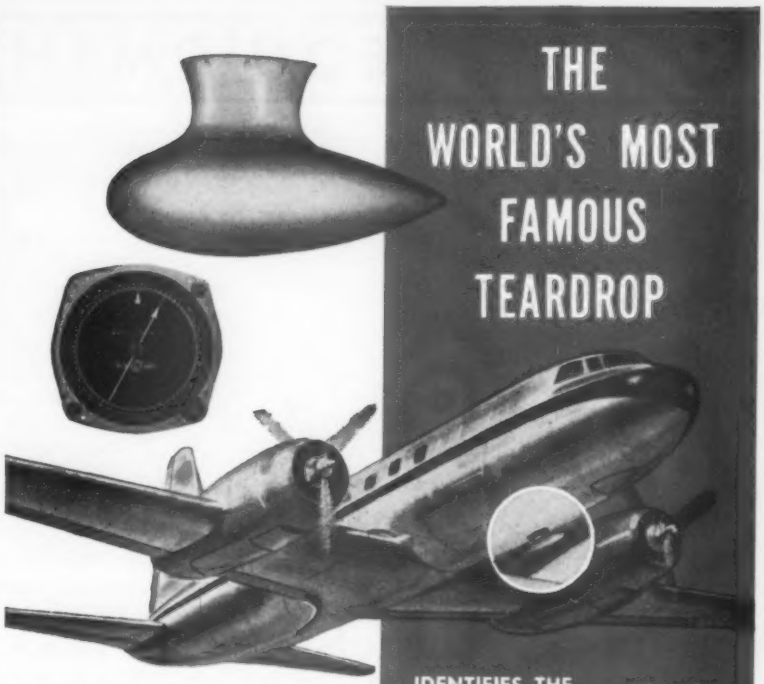
For generators (51-1249):
Jack & Heintz Prec. Industries, Inc., Cleveland, on a bid of $85,861.18.

For aircraft storage batteries (51-1273):
Gould-National Batteries, Inc., Depew, N. Y., on a bid of $314,952.

For aluminum rods (51-837):
Bohn Aluminum & Brass Corp., Detroit, on a bid of $10,471.20.

For packing, ring (51-845):
Parker Appliance Co., Cleveland, on a bid of $233,573.20.

For connector (51-862):
Companies sharing: Continental Electronics Limited, Brooklyn, N. Y., on a bid of $3290; Westinghouse Electric Supply Co., Dayton, on a bid of $5717; Cannon Electric Development Co., Los Angeles, on a bid of $2868.50; Industrial Precision Products Co., Chicago, on a bid of $3420, and Allied Radio Corp., Chicago, on a bid of $114.



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PAN AMERICAN'S Miami Base is the world's largest airplane maintenance facility.

PanAm Base Levels Work Peaks

"Equalized service," with specific jobs assigned to specific terms, stabilizes labor force, cuts costs.

By George L. Christian

Miami—Pan American World Airways has undertaken the enormous job of leveling the manhour peaks and valleys existing in its huge workshop—the Miami Overhaul Base.

Called "equalized service," PAA's new maintenance philosophy is a form of continuous maintenance. Goal is to accomplish a standard and equal number of manhours of work on an aircraft each time it arrives at the base. Attainment of a completely equalized maintenance program on a year-round basis means an equally stabilized labor force, with none of the usual seasonal lay-offs and temporary hiring.

In partial operation on Pan American-Grace Airways, Inc. DC-6s since September, 1950, equalized service has shown these encouraging results, according to R. C. Zinn, PAA's aircraft service superintendent:

During the first quarter (September-December), no increase in cost of overhaul was apparent despite an occasional dislocation, inevitably associated with a new system. Now, in the second quarter, it is apparent that at least a 5 percent saving will accrue. An additional 5 percent is forecast for the succeeding quarter. Zinn was unwilling to predict how much more economy the system might reflect after that. But the predicted 10 percent saving alone will more than justify the new service.

Zinn feels that the system's most important advantage is the establishment of a constant, stabilized work force, with little requirement of hiring, firing or staffing up for peak work loads. This and the fact that foremen and mechanics work as a team are important morale boosters, Zinn says. A corollary to the stabilized work force and high morale is faster, better work and low labor turnover, reflecting greater economies.

► **Teamwork**—Not only do the foremen and mechanics work as a team, each group is assigned to one particular part of an airplane. Each time a plane comes in for service, the same team works on the same part, irrespective of shift. Result is extreme ease in tracing responsibility for work well or poorly done.

The small teams, because they work continually on a given part of an aircraft, become extremely familiar with their duties and work at high speed.

A standardized work load permits more precise planning and therefore greater aircraft availability. This, in turn, results in better on-time performance. Since the system has been in operation, on time performance has improved.

► **Current Status**—This is the current status of PAA's equalized service program:

The DC-6s, on which the system is most advanced, have had no. 1, 2, 3 and 4 services equalized. These were performed at 60, 175, 325 and 1300 hr. respectively. Still to be brought into the orbit are the no. 5, 6, 7, and 8 services performed at 2500, 4000, 6000 and 8000 hr. PAA is working on that.

This is how equalized service works:

When a plane comes into the hangar, the number of man hours to be expended on it during a fixed elapsed time has been predetermined. Of total time alloted to the plane, a certain part is allocated to fixed service items performed each time the ship comes in to the base. The balance is spent on longer service items which can be done in stages.

Efforts are made to avoid duplication of work. Wing inspections, for instance, are completed first on one wing then on the other, so inspection doors will not have to be reopened.

Of the five different types of aircraft overhauled at the base (AVIATION WEEK Jan. 29), the second to receive equalized service was the Convair 240. On this ship, the no. 2, 3, and 4 services were equalized.

Another method PAA uses to distribute work loads evenly—one fairly well recognized in the industry—is the establishment of non-mandatory modification programs and inspection work for off-season periods.

► **Planning**—PanAm's planning organization at Miami was able to prepare so expertly for the seven Constellations and ten Stratocruisers PAA acquired through the merger with American Overseas Airways that not a single extra man had to be hired in the aircraft service department. And the 17 large, four-engined planes were integrated into Pan Am's fleet almost overnight.

There was a mitigating factor. To avoid costly standardization of AOA's Boeings with those of the Atlantic and Latin American divisions, the Stratocruisers were exchanged for an equivalent number of Pacific Alaska division planes already conforming to Pan Am specifications.

AOA standards will apply to the Pacific Alaska division planes until modification is practical according to Zinn.

To coordinate planning within "our four little airlines," as Zinn describes it, supervisory personnel joins in a maintenance meeting every morning.

Here a 60-day master plan forecast is used to set up exact requirements for the next 24 hours on manpower, aircraft needs, necessary priorities, and a semi-firm pattern for the ensuing five days. This method has unraveled many a maintenance knot. It lets each department and section know the plans of the rest of the group.

Coordination is aided by the fact that the closely integrated organization is all under one roof.

On the fourth floor of the main building is traffic reservations control; on the third, operations, crew and aircraft scheduling. The second floor houses maintenance production control. The production line organization occupies the ground floor.

All units are closely knit and well supplied with teletype circuits to their counterparts in the company's New York offices.

Zinn mentioned a new plan that Pan Am has to get more productive time out of production workers. This program, recently placed in partial operation, involves two-man teams, each consisting of a mechanic and a stores clerk, responsible for assisting in parts identification, emergency parts procurement, parts substitution and handling of all critical units.

The next step, says Zinn, will be for each team, working under an assignment plan, to be responsible for obtaining parts for mechanics on the job as needed. PAA hopes thereby to eliminate the many hours wasted each day by trips between job and the storeroom for parts. The company thinks the scheme will work.

An interesting sidelight is that the base charges Pan American's Atlantic and Latin American divisions and Panagra for work done on their planes. The same is true of other lines whose craft occasionally pass through MOB.

The fixed price charge is predicated on the predetermined number of hours established for a given service or inspection. Major unexpected items (such as fuel tank leaks) are billed separately. Prices are readjusted quarterly to keep them close to the breakeven point.

MOB's size is impressive. So is the efficiency with which the men operating the base under the management of Santos Ceyanes handle the continuous stream of diverse aircraft requiring maintenance.

Changes Will Boost Panagra DC-6 Speed

The fastest four-engine propeller-driven commercial airplane in the world will soon be flying Pan American-Grace Airways routes, the airline claims.

A half-million-dollar conversion program now underway involves converting powerplants and propellers of its entire DC-6 fleet. The current Pratt & Whitney R-2800 CA-15 engines will give way to the newer, more powerful CB-16 mounting the latest Hamilton Standard reversible pitch Hi-activity aluminum propellers.

Panagra says the engines, with additional water injection equipment, will put out 300 extra horsepower each at takeoff and 100 hp. more of cruising speed.

The propellers, it continues, will give better climb, altitude and speed performance. Combination will give the DC-6 15 mph. more speed, according to Panagra. Other advantage is 25-percent reduction in takeoff run at sea level at maximum gross weight of the aircraft.

Bendix-Scintilla low tension ignition systems will be installed " . . . to increase reliability and provide smoother performance."

The same powerplant-propeller combination will be installed on the two DC-6Bs ordered by the company for delivery early in 1952.

Recording Camera Withstands High G

A new aircraft instrument recording camera will be put into production next month by Guild Laboratories, 6264 Sunset Boulevard, Hollywood, Calif.

The unit, called the Automax, is priced under $1000. It will operate under acceleration loads of 10Gs in the vertical plane and 5Gs in the horizontal plane. A special "Hi-G" motor and clutch combination is avail-

MAMMOTH REFUELER

This 36-ton giant is the largest aviation fuel truck in the world, according to Standard Oil of California, its designer. Just put in service at Honolulu International Airport, the 7000-gal. capacity allows it to supply a complete fuel load for a Honolulu-mainland flight. The 53-ft.-long truck-trailer discharges fuel through four hoses at 400 gpm.

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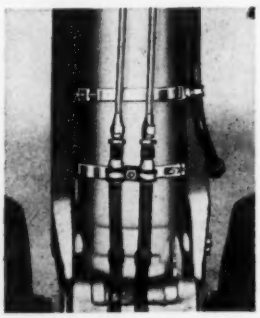
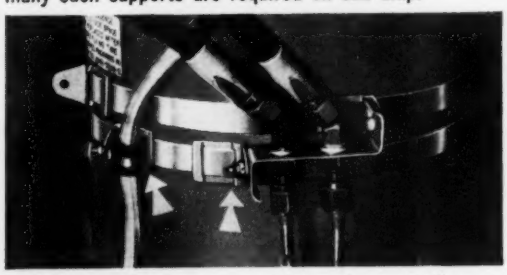
Fast, efficient, positive attachment for hydraulic lines, wiring accessories.



Marman support clamps perform an infinite variety of tasks. The lug support clamp illustrated fastens hydraulic lines to the main landing gear on a large bomber. It is ideally suited for applications where a highly stressed machined part prohibits the use of welded lugs.

The clip support shown below accomplishes a similar purpose except that it holds hydraulic lines farther away from the strut and provides a lighter assembly with slightly less strength. Its use may be preferred where many such supports are required on one ship.



Throughout the airframe structure lug and clip supports find many applications. Line support clips, wiring harness clips, attachment of ducting, are just a few of the many light duty installations for which they are suited.

By specifying one of the many highly adaptable standard Marman designs, of which these are typical, you achieve significant savings in development and production costs. In addition you gain the benefit of maximum service tested performance.

Save cost and design time with Marman...

Standardized Clamps for Specialized Applications

For information, write Dept. W-3

MARMAN PRODUCTS CO. INC.

940 W. FLORENCE AVENUE
INGLEWOOD, CALIFORNIA

able for greater acceleration loads.

The camera was designed by H. G. Cunningham, Hollywood camera designer, and A. P. Neyhart, formerly with Douglas Aircraft, who list the following specifications for the unit:

- **Film size:** 35mm with standard four-perforation pull down.
- **Frame rates:** Up to 5 frames per sec. on "interval" operation and from 12 to 16 frames per sec. on "cine" operation.
- **Lens mount:** Accommodates all Leica-type lenses.
- **Temperature range:** −40 to +160 deg. F.
- **Footage indicator:** A film-driven switch pulses an electric counter once for each foot of film exposed. Counter may be remotely located and indicates camera operation.
- **Motor:** Constant speed, operates from 20-30v. dc. Others are available to operate from power sources ranging from pocket batteries to 115v. dc.
- **Frame registration:** accurate to .0002 in. to simplify motion studies.

The makers say that maintenance and inspection of the camera has been simplified as much as possible. All parts of the camera are readily accessible for servicing.

Pakistan Orders Direction Finders

Three VHF Type AD. 200 direction finders have been ordered by the Pakistan Air Force for use as navigational aids in that country.

This VHF ground equipment provides instantaneous bearing indication of two aircraft transmitting simultaneously on different frequencies in the 118mc. to 132mc. band, according to the manufacturer, Marconi Wireless Telegraph Co., Ltd.

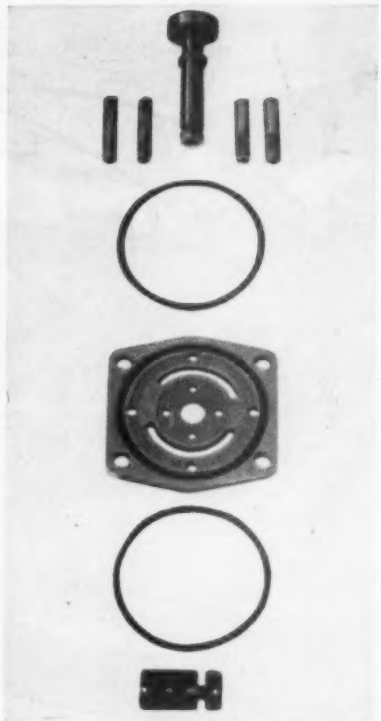
Indicators, 8 in. in diameter and covering 360 deg., show either the true bearing of a plane from the station or the magnetic course which the pilot must take to reach the station.

Better Autopilot

Two new devices extend the use of the Lear F-5 autopilot to allow unlimited maneuverability and automatic target tracking, according to W. R. Lear, who recently was awarded the Collier Trophy for research and development work on the L-5.

Automatic target tracking will be accomplished by coupling radar devices to the computer of existing autopilot equipment.

Lear pointed out that this electromechnical team will relieve the fighter pilot of much of the physical effort heretofore required in combat tactics.



Wafer Kits Boost Pump Reliability

Vickers fixed-displacement hydraulic pumps equipped with metered valve plates for mounting the wafer kit modification are about five times as reliable as standard pumps, according to evidence gathered by the manufacturer (AVIATION WEEK Nov. 27, 1950). They cost less to overhaul, too.

After 8000 hr. service accumulated on aircraft of various airlines, Vickers says, the new type pumps have cost 85 percent less to overhaul. The firm asserts that when the Convair 240 hydraulic cabin supercharger drive was evaluated (wafer kit vs. no wafer kit on model PF50-3915 pumps) no true parts failures had occurred on the former.

The major problem found was ". . . worn cylinder block bores caused by oil contamination from known sources."

Vickers points out that 8000 hr. of supercharger drive operation is roughly equivalent to 80,000 hr. of main hydraulic pump operation because the former functions some 110 percent of flight time while the latter does only about 10 percent, so evaluation of supercharger drive components can be done in one-tenth the time of an intermittent, unloading-valve-type hydraulic system.

To encourage Convair 240 operators to avail themselves of the wafer kit, Vickers is giving them at no charge one kit per pump per aircraft plus 50 percent spares. This applies only to the PF50-3915 pump as used on the Convair.

New Uses Seen for Goodrich's Geon

More widespread and important new uses of vinyl plastics in aircraft electrical equipment and other applications are predicted by B. F. Goodrich Co. as a result of development recently of Geon 404 by its engineers.

This is a high-molecular-weight polyvinyl resin that can be processed without plasticizer. It has the advantages of high electrical, physical and chemical properties found in pure, unmodified polyvinyl chloride—but not its disadvantages.

Briefly, Geon 404 overcomes this dilemma: Polyvinyl chloride, unplasticized, has properties that are superior to other plastics, but it is dry and tough and hard to process in this condition. With a plasticizer added to soften it up, it can be processed easily, but then its physical, chemical and electrical qualities are impaired, making it unsuitable for many high performance applications.

Unplasticized Geon 404 is the answer, according to Goodrich. It re-

CONSOLIDATED VULTEE PHOTO

More Aircraft Alloys & Stainless In Stock . . . Quick Shipment

Aircraft alloy bars, sheets and strip in more than 400 sizes, finishes and conditions are now on hand at Ryerson steel-service plants. And more than 300 different items of aircraft stainless are also available in bars, sheets, and strip.

How are we able—at this time —to offer enlarged stocks?

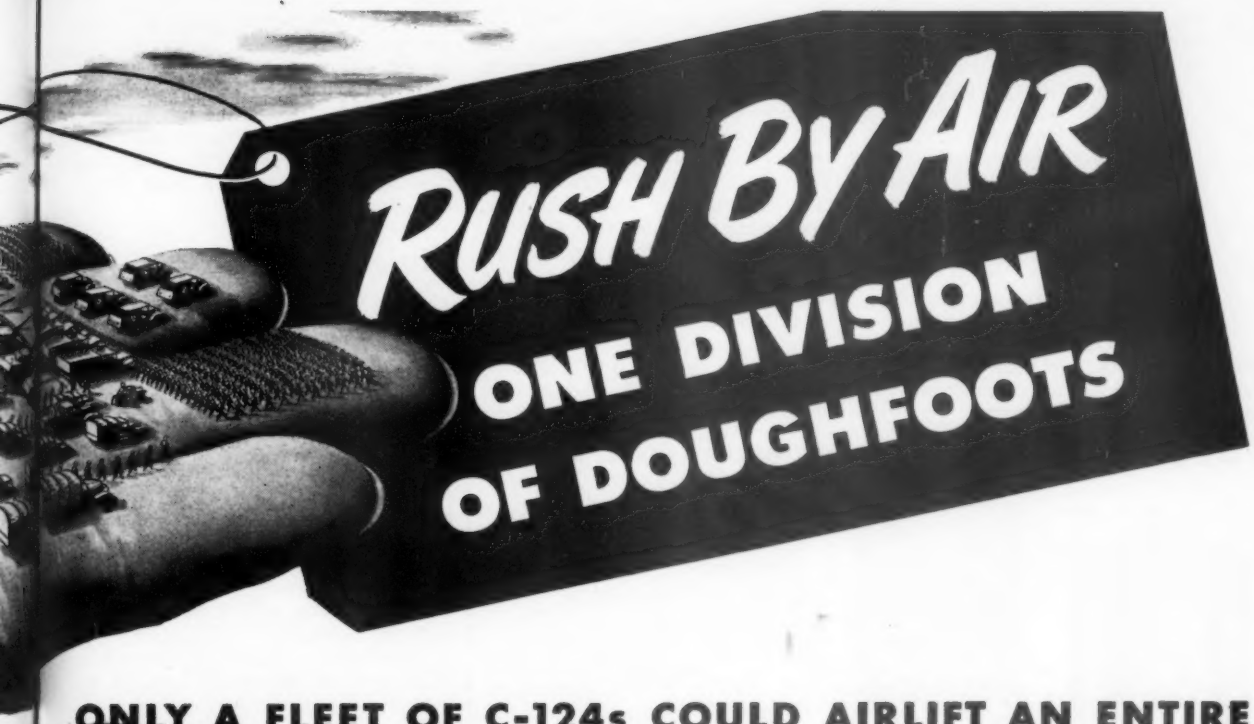
Months ago when the expansion of aircraft production was first being considered, we began planning to carry more aircraft steels. Now the planning is beginning to show results. And as the aircraft industry starts a program that will increase its capacity 16 times, our stocks now include alloy and stainless steels for aircraft parts manufacturers, air frame makers and engine builders conforming to all the widely used new MIL-S and AMS specifications now in effect. As additional products are covered by the new specifications our stocks will be quickly adjusted to conform.

Ryerson plants are set up to meet aircraft steel requirements exactly; deliver them in a hurry, accurately cut to order. So call us for your requirements. We'll get them to you fast.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK, BOSTON, PHILADELPHIA, DETROIT, CINCINNATI, CLEVELAND, PITTSBURGH, BUFFALO, CHICAGO, MILWAUKEE, ST. LOUIS, LOS ANGELES, SAN FRANCISCO

DOUGLAS GLOBEMASTER II



ONLY A FLEET OF C-124s COULD AIRLIFT AN ENTIRE INFANTRY DIVISION AND ALL ITS EQUIPMENT

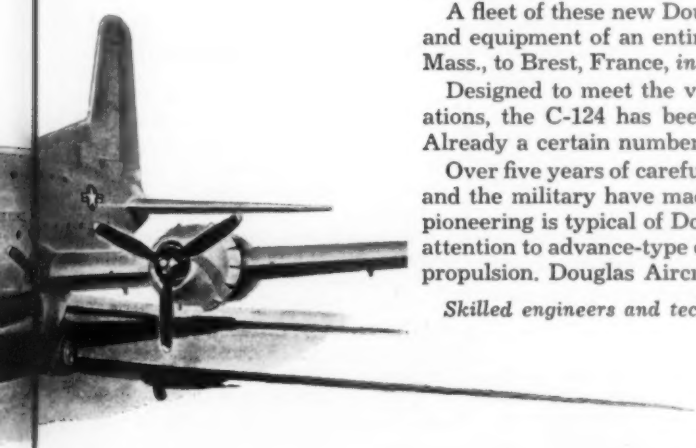
Quickly the giant Globemaster II brakes to a stop. Its clamshell doors fold back. Down comes the self-contained ramp. And seconds later battle-ready troops are pouring out of her monstrous belly. Nearby other C-124s unload such divisional equipment as M-24 tanks, 155 mm. Long Toms, bulldozers, trucks and scrapers.

A fleet of these new Douglas transports could airlift all the personnel and equipment of an entire 16,000-man airborne division from Boston, Mass., to Brest, France, *in a single flight!*

Designed to meet the vital need for aircraft to support global operations, the C-124 has been ordered in quantity by the armed forces. Already a certain number are in active service.

Over five years of careful planning and development work by Douglas and the military have made possible this revolutionary airplane. Such pioneering is typical of Douglas engineers, who are today turning their attention to advance-type combat planes with jet, rocket and turbo-prop propulsion. Douglas Aircraft Company, Inc.

Skilled engineers and technicians find Douglas a good place to work!



Depend on **DOUGLAS**

WORLD'S LARGEST BUILDER OF AIRCRAFT FOR 30 YEARS — MILITARY AND COMMERCIAL TRANSPORTS
FIGHTERS — ATTACK PLANES — BOMBERS — GUIDED MISSILES — ELECTRONIC EQUIPMENT — RESEARCH

tains the high qualities of unplasticized polyvinyl chloride and is easily processed at the same time.

The company strongly emphasizes "rigid vinyl insulation based on 404 has electrical properties definitely superior to and unattainable with plasticized polyvinyl chloride." The material can be processed (extruded, calendered, molded) into "rigids" on coventional plastics production machinery, adds the firm.

Besides much greater insulation resistance and dielectric strength compared to plasticized vinyls now used, 404 is more rough and ready. Goodrich tests indicate it has twice the deformation resistance, about three times the tensile and compression strength and nearly four times greater resistance to cutting and abrasion than vinyl insulation now used. Its impact resistance compares favorably with that of tough fibered cellulose acetate.

Here are a few lightweight electrical applications that may develop for vinyl compounding based on Geon 404.

- **Primary insulation** on aircraft wiring eliminating need for jacket.
- **Jacket for coaxial cable.**
- **Weatherproof line wire** and radio hook-up wire insulation.

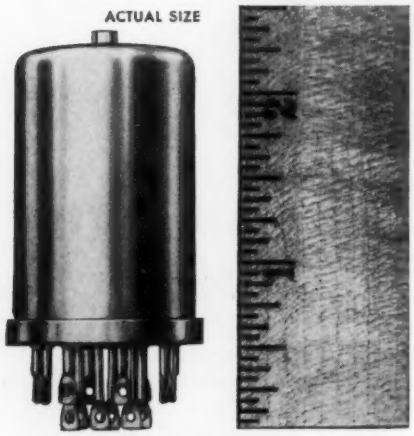
Rigid sheets of Geon 404 can be welded by the hot gas technique, then fabricated into hoods, ducts or tanks for carrying corrosives. It can be machined into bearings, valves, gears and other parts. And since it can be drawn and molded to reveal the finest detail, it can be formed for example, into topographical maps for military use, says Goodrich. Address: 324 Rose Bldg., Cleveland 15.

A New Advance IN HERMETICALLY SEALED, MINIATURE

Aircraft Type Relays

by "Diamond H"

ACTUAL SIZE



Basic Data

4 POLE DOUBLE THROW

SIZE: *smallest of its type, 1.5 cubic inches*

WEIGHT: *lightest of its type, 3.5 ounces*

SHOCK RESISTANCE (operating): *greatest of its type, 50 G.*

TEMPERATURE RANGE: *widest of its type, −65°C. to +200°C.*

Plus these other important specifications:

1. **Contact Rating:** 2A, 28V, D.C.; 2A, 115V, A.C., 400 cycle.
2. **Contact Overload Rating:** 12A, 28V, 20 sec.
3. **Altitude Rating:** Dry, inert gas, pressure filled; hermetically sealed.
4. **Coil Resistance:** 150 to 10,000 ohms.
5. **Coil Voltage:** 18 to 250V, D.C.
6. **Terminal Arrangement:** soldered connections; plug-in optional.
7. **Mounting:** Variable.
8. **Variations:** Virtually innumerable, in voltage, amperage, number of poles (4 maximum) and temperatures.

To meet exacting requirements of missiles, rockets and other air, ground, and marine applications, this new relay incorporates a hitherto unmatched combination of characteristics. The combination is achieved through several unique design features developed by The Hart Manufacturing Company, producer of dependable electrical controls and devices for more than half a century.

Write today for complete information on this new relay. We'll gladly work with you to develop any special variation to meet your specific need.

The Hart Mfg. Co.
215 Bartholomew Ave.
Hartford, Conn.

Send me further information about your new relay.

Name _____

Title _____

Company _____

Street _____

City _____ *State* _____

Finishes Metal

A finishing process for aircraft fluid fittings, valves and other parts made of corrosion-resistant steel, is being offered by Airborne Equipment, Ltd., Santa Monica, Calif.

Reportedly already accepted and used by the Air Force, Navy and some manufacturers, the process is owned by Electro Polishing Co., Los Angeles, and is offered by Airborne after collaboration with this firm.

With chromium-nickel series, AISI-300 Types, Austenitic, for example, the finishing process will accomplish the following, according to Airborne:

- **Produce a chemically pure surface.**
- **Remove all imbedded,** smeared or flowed metal and foreign matter.
- **Deburr and de-scale all sharp edges,** including "orange peel" at thread roots.
- **Completely passivate** and relieve surface stresses and strains.
- **Increase corrosion resistance** 500-700 percent (conclusive tests by both military and manufacturers show this, says firm) and develop high luster polish, up to No. 12 mirror finish on dense metal.

Protects Aluminum

An "Alodine" brush-on kit, containing sufficient chemicals to Alodize 1000 sq. ft. of aluminum in the shop or in the field is being offered by American Chemical Paint Co., Ambler, Pa.

Designed to provide protection to both painted and unpainted aluminum surfaces against humid, salt-laden and industrial atmospheres, the Alodine process produces a tough, skin-like coating that is highly corrosion-resistant and "tenaciously holds paint" according to the company.

A big advantage that is claimed for the process is that it requires a minimum of equipment and skill—eliminating the need of high-temperature treatments or expensive electrolytic equipment.

Tests show Alodine coatings compare favorably with the oxide films created by anodic processes and by akaline chromate treatments, says the firm.

The quick brush-on kit consists of ½ gal. of ACP "Deoxidine," one quart of Alodine liquid and a 2-lb. canister of Alodine Make-Up Powder.

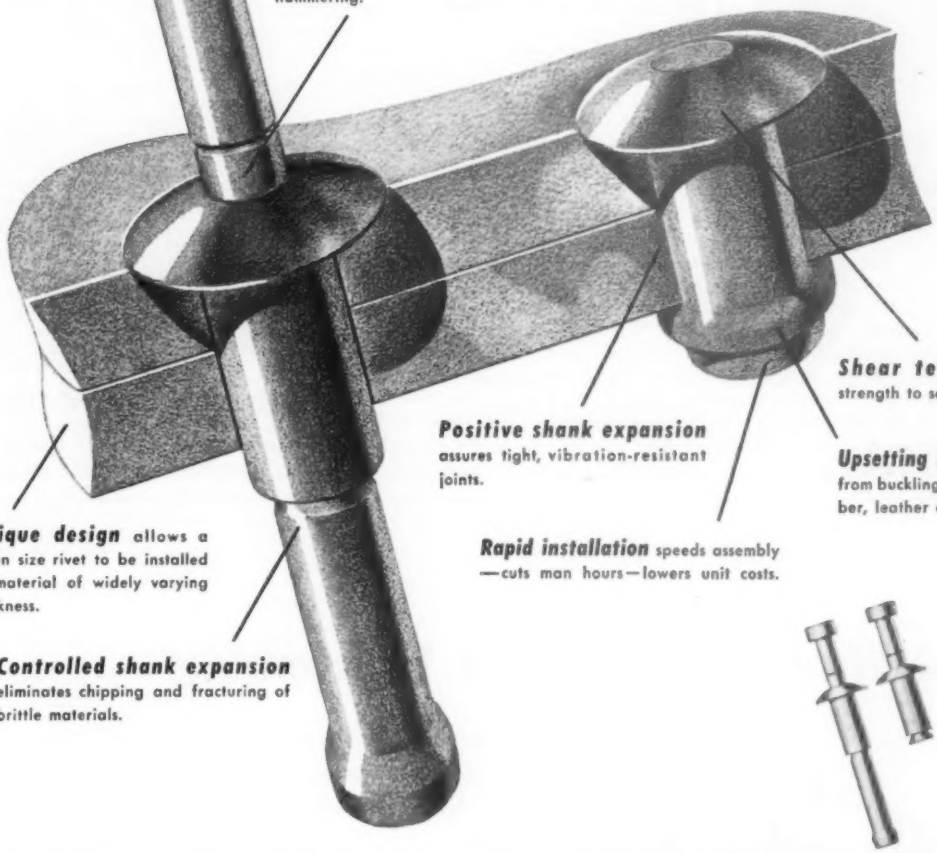
Here's why

CHERRY RIVETS

make the hard jobs easy

Installed by one man from one side of the job.

A pulling action does the work —no twisting, no exploding, no hammering.



Shear tests show comparable strength to solid rivets.

Positive shank expansion assures tight, vibration-resistant joints.

Upsetting method prevents shank from buckling in soft materials like rubber, leather or fabric.

Unique design allows a given size rivet to be installed in material of widely varying thickness.

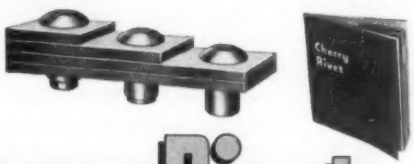
Rapid installation speeds assembly —cuts man hours—lowers unit costs.

Controlled shank expansion eliminates chipping and fracturing of brittle materials.

For you, the particular value of Cherry Rivets may be the simplicity of installation. Or you may need the strength of Cherry Rivets and their vibration-resistance. But if you haven't met their money-saving advantages, take a moment today to ask for full information covering your applications.

Once you've realized the potential values in Cherry Rivets, your engineers and Cherry's can cooperate in determining the savings for your business.

Standard Cherry Rivets are available in five diameters, from 1/8" to 9/32". Special sizes manufactured on order.



Cherry Rivet

COMPANY

A Division of Townsend Company

CHERRY RIVETS ARE APPROVED BY U.S. NAVY, U.S. AIR FORCE AND CIVIL AERONAUTICS AUTHORITY. CHERRY RIVETS ARE PATENTED.

Cherry Rivet Company, Dept. C-110
231 Winston Street, Los Angeles 13, Calif.

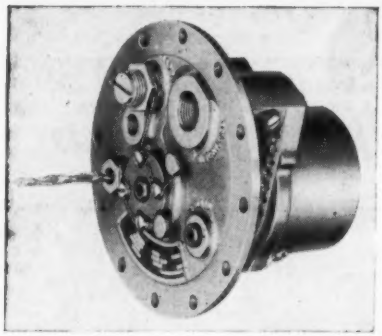
Please send me further information describing Cherry Rivets; no obligation, of course. ☐ bulletin ☐ sample rivets

Name_____ Title_____

Firm_____ Address_____

City_____ Zone_____ State_____

NEW AVIATION PRODUCTS



Small Fuel Booster

A lightweight submerged type fuel boost pump, designed specifically for small planes and helicopters, now is being manufactured by the Adel division of General Metals Corp.

The compact, impeller-type pump has a minimum output of 40 gpm. and a discharge pressure of 11 psig. The unit will operate through an ambient temperature range of —65 to 160F. It has an integral relief valve that is adjustable between 3 and 12 psi. The relief limits shut-off pressure to a maximum of 2 psi. above pressure at rated flow. Through the bypass check valve, pressure drop is one inch mercury at 80 gph. The pump operates on 12 and 24v. dc. electrical systems, draws 2 to 4 amp. and weighs 2 lb. 7 oz. Address: 10775 Van Owen St., Burbank, Calif.

Tones Down Jets

One way of squelching the roar emanating from jet engine test cells during run-up periods is by using B&W Insulating Firebrick.

According to the maker, Babcock & Wilcox Co., its K 26 firebrick, normally used for high temperature insulation in industrial furnaces, has been installed by General Electric Co. to cut down noise in 14 jet engine test cells at GE's Lockland, Ohio, plant.

B & W started selling its product for this purpose after tests showed it had "unusual sound absorbing properties as well as resistance to high temperatures."

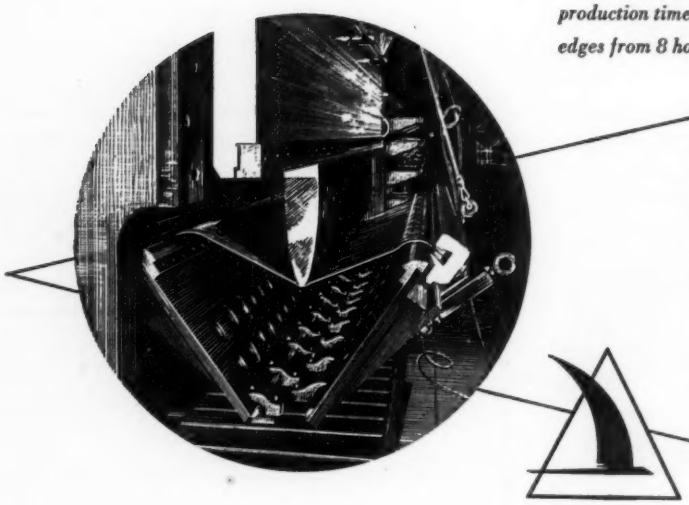
At Lockland, sound is reduced so that at a short distance from the plant it is no louder than a noisy office, says the company. In each cell, air is admitted through one end of the chamber, passes through and around the engine and is ejected along with exhaust gases through a steel pipe which runs part of the length of the cell and makes a right angle bend to go up 20 ft. into the exhaust stack. The exhaust stack is 50 ft. high with an inside diameter of 6½ ft. It is this area which is lined with specially treated insulating firebrick. Exhaust gases passing through the stack may reach 900F. A strong point for the firebrick is that it absorbs sound efficiently over a wide range of frequencies, the maker says. Address: 85 Liberty St., New York 6.

High-Speed Motors

A new addition to the line of fractional horespower electric motors pro-

Fast Way to Build Fast Fighters!

Special press devised by Northrop cuts production time on single operation for wing leading edges from 8 hours to 2 minutes.



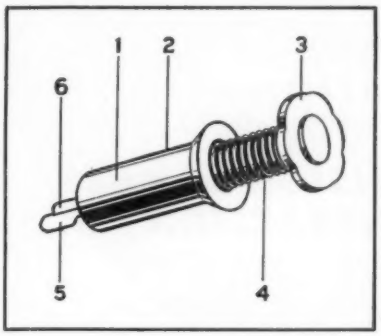
Hours saved by special manufacturing techniques at Northrop mean faster delivery of all-weather Scorpion F-89 interceptors for our country's defense. These speedy, heavily-armed U. S. Air Force F-89's, with electronic search equipment, are worthy successors to the hundreds of deadly P-61 Black Widows built at Northrop during World War II.

NORTHROP

Pioneer Builders

duced by John Oster Mfg. Co., Inc., is a 400-cycle unit described by the firm as "especially suited to needs calling for high speeds and plenty of power."

This lightweight avionic equipment is available as a capacitor run single-phase or poliphase induction motor. Typical continuous duty ratings are 1/100 hp. at 7000 rpm. on 400c. current or 1/300 hp. at 3000 rpm. on 60c. current. The maker is located at Racine, Wis.



Finger Sheet Clamps

"Interlock" sheet clamps, already proven on production lines in England, now are being introduced to this country by Air Associates, Inc.

Clamps can be compressed by hand for insertion into sheet metal holes —no pliers are used—and for stubborn, poorly aligned, heavier or curved sections, sheets can be drawn together by fingertip screw action after the clamp has been inserted.

Air Associates says these clamps permit speedup of assembly operations for riveting, offer greater clamping strength, have a high safety factor, are vibration-proof and can be used with a wide range of material thicknesses.

For extra safety, the clamping rod overhang on this part is half the diameter of the rivet hole rather than only a few thousandths of an inch, the company explains.

The Interlock sheet clamp consists of a completely enclosed steel spring (1), cylindrical sleeve (2), clamping nut (3) which rides on a tapped piston (4), clamping rod (5), and slider (6). Address: Teterboro, N. J.

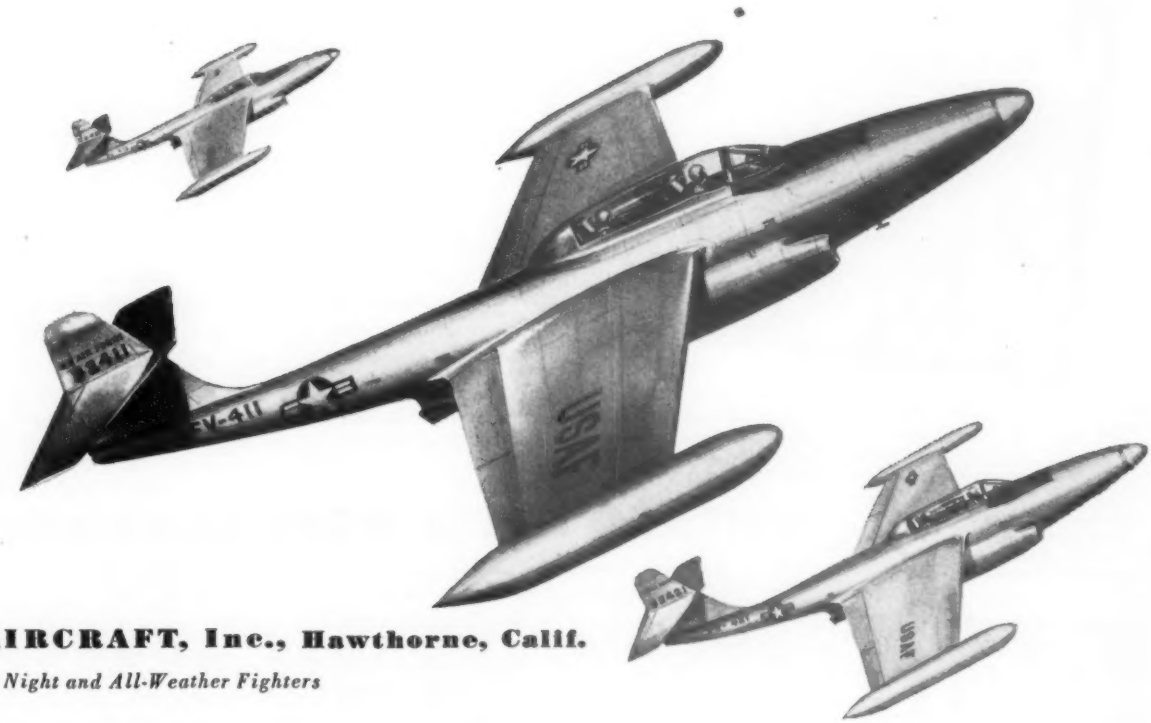
ALSO ON THE MARKET

Thermal time delay relay, hermetically sealed, but designed to permit adjustment of the time interval, fits seven-pin miniature tube socket or octal base; measures ¾ in. dia., 2⅜ in. seated height. Timing range up to three minutes available; weight from 1.5 to 2.5 oz., depending on mounting arrangements. Made by G-V Controls Inc., 28 Hollywood Plaza, East Orange, N. J.

Coolant pump and tank can be used with most wet machine tools, meets needs of multiple-spindle drill presses up to eight spindles. Adjustable nozzle directs and controls coolant flow as desired. Several pump models available deliver 6 to 32 gpm.; no piping required between pump and 16-gal. tank. Made by Delta Power Tool division, Rockwell Mfg. Co., Milwaukee, Wis.

Portable furnace for hangars, shops and other enclosures requires no smoke stack, can be operated simply by throwing switch after connecting to 110v. a.c. line, attaching hose to drum carrying No. 2 grade oil and hanging up thermostat. Made by Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J.

Precision bushings for grinding wheels promise longer life, preserve inherent balance and hole size of wheels. For straight wheels from 5 to 8 in. in diameter, these press-fitted, lightweight bushings are made by Horton Co., Worcester, Mass.



AIRCRAFT, Inc., Hawthorne, Calif.

of Night and All-Weather Fighters

CMH REX-FLEX Flexible Metal Hose

solves these troublesome connection problems

- VIBRATION
- MISALIGNMENT
- FLEXATION
- EXPANSION and CONTRACTION

Above — 1. Rex-Flex metal braid covered connector in a heating duct. 2. Rex-Flex ducting that combines rib reinforced sections with corrugated elbow forming sections. 3. Corrugated Rex-Flex hose used as a generator blast tube.

ALL lines conveying gases or liquids in aircraft are subject to one or more of the basic motion problems listed above. In most cases, the solution is a simple one—CMH REX-FLEX flexible metal hose, ducting or connectors. Fabricated from stainless steel and corrugated in various forms to suit the application, CMH REX-FLEX offers many time and money saving advantages. It combines the durability of metal with a high degree of flexibility and high resistance to vibration and flexing fatigue. It can literally be threaded through the tight spots with a minimum of fittings and assembly effort.

Air-tight, gas-tight REX-FLEX is made in sizes and types to meet virtually all aircraft requirements, including C.A.A. approved fireproof fuel and oil line assemblies. For complete information on specific assemblies to meet your needs, send details of your application.

Flexon identifies CMH products that have served industry for over 49 years.

CHICAGO METAL HOSE Corporation

1302 S. Third Ave. • Maywood, Ill. • Plants at Maywood, Elgin, Rock Falls, and Savanna, Ill.
In Canada: Canadian Metal Hose Co., Ltd., Brampton, Ont.

CMH

ONE DEPENDABLE SOURCE
for every flexible metal hose requirement

Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals • Expansion Joints for Piping Systems
Stainless Steel and Brass Bellows • Flexible Metal Conduit and Armor • Assemblies of These Components

CAB Role May Hinge on New Chief

Strength and independence of Board seen depending on strength of Chairman; Nyrop appears the favorite.

Future of the Civil Aeronautics Board had a lot of questions surrounding it last week. But most of them could be answered fairly clearly by the nomination of a new CAB chairman as successor to Delos W. Rentzel, who is to become Undersecretary of Commerce for Transportation (see story page 13).

The most likely prospect to take the place of Rentzel, on the basis both of qualifications and acceptability to the Administration, alike, was Donald W. Nyrop, now CAA Administrator.

Nyrop, a Nebraskan, was once assistant to the CAB Chairman, when L. Welch Pogue held that office. Nyrop also had a legal background and served in the CAB general counsel's office when Pogue was general counsel before he became board chairman.

▶**Various Posts**—Later Nyrop served with Air Transport Command during World War II, then at Air Transport Assn., and finally returned to government work, as assistant to Rentzel, then CAA administrator. When Rentzel moved to the board chairmanship, Nyrop moved up into the top spot at CAA, succeeding him. The two men have continued to work closely together in Air Coordinating Committee and as heads of the two big federal civil aviation agencies.

Selection of a well-qualified chairman is considered by aviation observers to be almost a pre-requisite if the board is to continue as a strong independent organization. And it is understood that President Truman has indicated that he wants it to continue strong and independent.

Interpretations that the new war powers for the Undersecretary of Commerce for Transportation mean less powers for the CAB are being discredited by informed sources as far as normal peacetime operations of the board are concerned. And theories reported about cutting down the size of the board to perhaps three men, are not confirmed by the recent nomination of a new fourth member of the board, to succeed a member who has retired—former Senator Chan Gurney replacing Harold Jones.

Only two members remain who were members of the five man board as recently as two months ago. They are acting Chairman Oswald Ryan and Josh Lee. To these are added the recent appointee, Joseph Adams, who joined the Board in January.

▶**Chairman Awaited**—Former Senator Gurney, nominated for the fourth place on the Board, is expected to be confirmed. And that will complete the Board roster except for the chairman, who will succeed Rentzel.

Timing of the whole sequence of appointments is somewhat held up pending the action on the appointment of Maj. Gen. Philip Fleming, currently Undersecretary of Commerce for Transportation, who is to become ambassador to Costa Rica. Until Fleming's appointment is confirmed, the sequence of moves involving Rentzel and his successor as CAB chairman, cannot be started.

Washington observers are confident that the fairly definite CAB policy hacked out over the past two years will last through this most recent series of personnel changes.

The permanent staff of Board experts, and presumably also the will of the President, may effectively prevent any radical change in policy and action. The policy planning group of top staff experts is made up of Warner H. Hord, chief of Accounting and Statistics division; Bernard Selebos, chief of the Routes division; Frank J. Crozier, economic adviser to the Board; and Robert J. G. McClurkin, special adviser to the Board. The continuing policy planning and advice of this group, as well as the rest of the staff chiefs, should assure some continuity of CAB member interpretation of the Civil Aeronautics Act.

▶**New Status**—Now more than ever the chairman of the CAB is important, if he is active. Under the recent government reorganization the CAB chairman has become directly responsible for administration of the staff, so that he now holds considerably more control than he used to as merely the fifth (though slightly exalted) Board member.

Continental Asks O.K. On Mid-West Purchase

Continental Air Lines has asked the Civil Aeronautics Board to approve its purchase of the "local service airline," Mid-West Airlines, Inc. At the same time, Continental confirmed its order for seven new Convair-Liner 340s, with option to buy three more.

Continental will use DC-3s on Mid-West's routes instead of the present single-engined Cessnas. Added cost will be $600,000 annually, says Continental president Robert F. Six. Another $400,000 will go to establish service on other proposed routes to Chicago from Minneapolis and St. Paul via Moline, Rock Island, East Moline and Davenport.

President Six says using his DC-3s will expand service on the new routes five times over present levels.

Continental and Mid-West also ask CAB to approve an extension of the Omaha-North Platte segment of Mid-West's routes to Denver. Denver is headquarters and operating base for Continental. They also want CAB to extend the term of Mid-West's operating permit, scheduled to expire this June.

▶**Now Has Five**—Continental now has five 40-passenger Convair-Liners, 21 DC-3s, plus the ten 44-passenger Convair-Liners on order or option. Reports are that Continental plans to exercise its option for all ten.

Cost of seven Convairs fully equipped for Continental is $4,300,000, or about $614,000 each.

Continental and Mid-West say Continental's present maintenance, operation facilities and administrative personnel will be utilized more after taking over Mid-West. This, they say, will "allow Continental to reduce its operating costs approximately $400,000 annually."

Continental's present system serves 33 cities with population of 3,848,264, in the states of Colorado, Kansas, Missouri, New Mexico, Oklahoma and Texas. The two airlines together would have 63 cities with total population of 6,204,084 and total routes of 4300 miles.

2 de Havilland Doves Ordered by Wiggins

First U. S. airline purchase of a British-made airliner is now definite, with announcement of feederline Wiggins Airways it is buying two 10-passenger de Havilland Doves for delivery this spring. Wiggins also has an option to buy several more Doves if they are required.

This depends mainly on the Civil Aeronautics Board action on Wiggins' request for New England-New York City service via Pittsfield. Wiggins' service pattern now is Boston-Albany with 16 intermediate stops along the route.

Original negotiations with de Havilland were mostly settled last fall (AVIATION WEEK, Oct. 30, 1950). But

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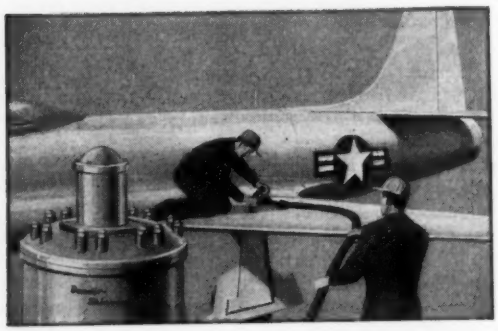

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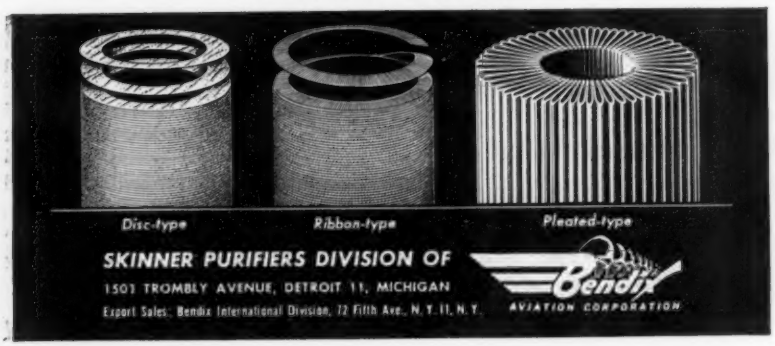

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Bendix AVIATION CORPORATION

Wiggins has had to wait for more financial assurances before going ahead on the deal. With unofficial CAB approval, Wiggins now feels it can announce purchase of the Dove—a modern short-haul transport.

Wiggins has only six twin-engined Cessnas. They carry 4 passengers plus one pilot. The Dove carries 10 passengers plus two pilots. It cruises at about 170 mph.

Eastern Asks Martin For 25 More 4-0-4s

Eastern Air Lines is ordering 25 more Martin 4-0-4s in addition to the 35 already ordered from Glenn L. Martin Co.

The 25 planes cost $20 million fully equipped. Eastern bought them under the option to buy more 4-0-4s at the original price, as stipulated in its first contract.

This makes an even 100 Martin 4-0-4s on order—60 for Eastern and 40 for Trans World Airlines.

Delivery schedule for Eastern's new 4-0-4s is: original 35 start deliveries this summer, with all 35 delivered by March, 1952; next 25 start in April, 1952, and complete by July—about 1½ years from now.

The new equipment will help Eastern overcome an equipment shortage on short as well as long runs. January traffic was up 51 percent over last year. And the second half of 1950 was 30 percent over 1949. Eastern plans to replace its DC-3s with the 4-0-4s.

CAB Eases Nonsked Regulations Slightly

CAB last week told the nonskeds they could fly any number of military contract flights in the next six months. Flights to major cities are still restricted to three a month; Puerto Rico flights must not exceed eight a month.

CAB named Air Coach Transport Assn. and Independent Military Air Transport Assn. as nonsked agents for military contracts.

Commercial Pilots Get Draft Delay Priority

Commercial pilots now have high priority for deferment from military service—even when they belong to military reserve units. The job of "airplane pilot, commercial" is one of only 58 jobs on the Labor Department's "list of critical occupations."

Some pilots in the reserve were uncertain on their status.

Air Force policy authorizes granting

delays to five categories of reservists. Pilots are now in category A, which is for "a reservist principally employed or engaged in a critical occupation in an essential activity."

Original critical list, made up by the Labor Department last August, held 48 jobs. Now there are 58.

Definition of "airplane pilot, commercial" includes pilot, co-pilot, check pilot, pilot instructor and pilot testing experimental transport and military aircraft.

Push for Single Transportation Body

The push for a single transportation regulatory agency will get underway in the Senate in a week.

Legislation rewriting the 1940 Transportation Act and setting up a National Transportation Commission, drafted by the staff of Inter-state and Foreign Commerce Committee, is being reviewed by Chairman Edwin Johnson and Sen. John Brocker. Johnson originally planned to introduce the measure for purposes of hearings. "But I am so much opposed to the single agency idea, that I might eliminate this provision before introducing it," he told AVIATION WEEK. The Chamber of Commerce is expected to adopt the recommendation of its transportation committee for a single agency. Airline members of the committee dissented on the measure.

Egypt Aids Native Airlines

(*McGraw-Hill World News*)

Cairo—Two Egyptian airlines, Misr-Air and Societe Aerienne International D'Egypt, serving Northeast Africa, the Middle East and Southern Europe, have received approval of the Egyptian Chamber of Deputies for supplementary credit of $376,200 for past services rendered.

The government is also relieving Misr-Air of payment of customs duties on fuel and machine oil. Oil required for the airline's regular services and for training and flight tests will be taken from bonded stocks. Oil used for charter and other private flights will be paid for at the end of each month on the basis of a written guarantee from Misr-Air of the amount used.

Misr-Air is a subsidiary of the giant Banque Misr, which has developed much Egyptian industry with government backing. SAIDE is a private native carrier, partly financed with Italian capital, which began operations three years ago.

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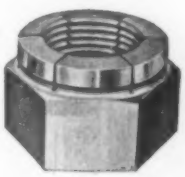

The one-piece FLEXLOC is both a stop and a lock nut, due to its resilient segments which lock *positively*, even under extreme vibration. Torque is unusually uniform—within a few inch pounds. "Thin" and "regular" types; NC and NF threads. Officially approved by many U. S. depts., bureaus, etc., and CAA for aircraft use.

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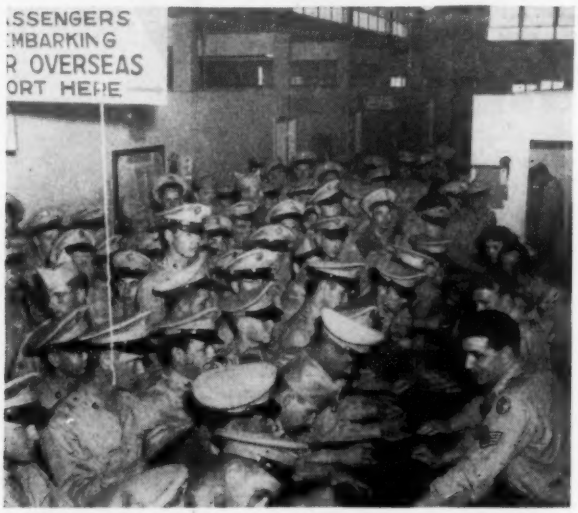
THE PLANES that haul vital war material and passengers to Korea include chartered airliners, such as the Flying Tiger Line DC-4 warming up at left, and MATS C-121A Connie and C-54 Skymasters lined up alongside.



THE PROCESSING of military personnel being flown to the Far East begins at Travis.

Airlines—MATS Team On Vital Korea Airlift

The crowded ramp at Travis AFB, Calif., marks the eastern terminus of a 7000-mi. aerial pipeline from the U. S. to UN forces fighting in Korea.

From here go the chartered DC-4s of foreign and U. S. airlines and the Skymasters, Globemasters, Stratofreighters and Connies of MATS carrying high-priority passengers and fighting men, vital material and blood plasma. Incoming planes bring battle casualties, evacuees, captured enemy equipment and other urgent loads.

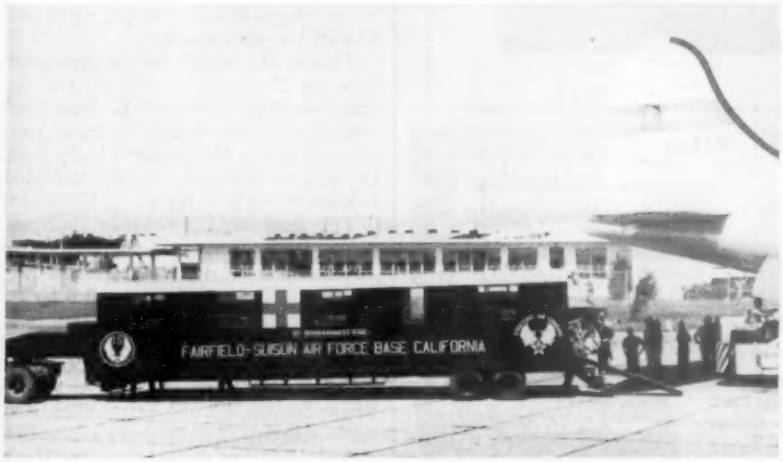
Commercial carriers include Northwest Airlines, United, Pan American, Seaboard and Western, Transocean, Flying Tiger, Overseas National, Alaska, California-Eastern, Canadian Pacific and Sabena.

THE PASSENGERS carrying rifles, carbines and hand luggage, line up by a chartered Transocean Air Lines' DC-4.

THE EVACUEES Wives and children of men ordered to Korea.

THE RAMP at Travis AFB, Calif., is spotted with transport used in the airlift. At left is the low-slung MATS passenger terminal.

THE BLOOD needed for battle casualties is fork-lifted into a MATS Boeing C-97A. The human whole blood is refrigerated, gets to Korea in 40 hr.



THE WOUNDED are unloaded from a Stratofreighter at Travis (formerly Fairfield-Suisun AFB) into an air conditioned 30-litter ambulance.

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PanAm Fights EAL Puerto Rico Award

Attack on the new Civil Aeronautics Board 1951 route policy and actions as inconsistent is made by Pan American World Airways in a petition to the President and the CAB. PanAm urges them to reverse their recent approval of Eastern Air Lines service New York-San Juan.

CAB, in recent policy statements and in the Southern-Service-to-the-West decision, said it would work for more trunkline self-sufficiency by curbing possibly disruptive competition. Yet CAB in its first two important route cases in 1951 has granted Eastern a long new route New York-San Juan, in direct competition with PanAm's existing service on the same route. A few days later CAB refused to allow a new transcontinental route giving southern service to the West; instead the Board ruled for interchange services over existing route segments, to avoid any new competition.

PanAm claims Eastern Air Lines' competition on the New York-San Juan run will make PanAm need $2.5 million more mail subsidy per year.

Pan American now asks an $11 or 15-percent fare reduction to $64 one way tourist-rate, New York-San Juan, to meet Eastern competition. At the same time, PanAm asks summer excursion, first-class, roundtrip fares of $150.50, New York-San Juan, and $100.15, Miami-San Juan, effective April through October.

Simplify Direct Flight By Air Taxi, Airline

A traveler living near an airport served by a certificated small irregular carrier may now fly direct to any city. The local "air taxi" will both fly him to a connection with scheduled airlines and arrange his reservations.

This is the result of an agreement between 21 scheduled airlines and the members of the National Air Taxi Conference. In many cases, the local operator will quote the traveler a lump price for both air taxi and through scheduled tickets.

The method will simplify air travel for some customers, in effect bringing major airports closer to their homes.

Among the small irregular carriers who have signed this agreement are: Aero Service, Air Service, Aviation Center, Central Flying Service, Clinton Aviation, Dixie Air Associates, Elliott Flying Service, Purdue Aeronautics, Red Bank Airport, Richland Aviation, Sky Travel, Southern Flight Service, Van's Air Service, Ventura Airpak, Wiggins Airways, and Wings, Inc.

SHORTLINES

▶**Air Transport Assn.**—Airlines will spend $100,000 promoting air parcel post and mail this year—same as last year . . . ATA asking CAB for the right to get in on the Inland and Western Air Lines mail rate case as "friend of the court." ATA favors the airlines in their claim that profits from sale of a route are "other revenue" and do not bear on mail rate determination.

▶**American Airlines**—A good public relations job by a stewardess starts paying off for AA this month. The MGM comedy movie "Three Guys Named Mike" released to the public this month is based on American Airlines Stewardess' experiences and airline operations. Stewardess Ethel Wells sold the idea to a movies director passenger on her flight one night, by describing some of the humorous incidents and the unique atmosphere of airlines life. She became technical advisor on the film production.

▶**Australian National Airways**—ANA carried over 30,000 tons freight in 1950—34 percent more than 1949 . . . ANA savs the Bristol freighter, moving 11,000 lb. in a load, and handling with big front opening doors, has helped the line build freight revenue to one-third revenue of all kinds.

▶**British Overseas Airways**—BOAC air freight increased 40 percent in 1950—5500 tons compared to 4000 tons. Trans-Atlantic BOAC freight operations gained 110 percent to 1,313,215 lbs.

▶**Dublin Airport**—Dublin was the busiest airport in the British Isles in 1950—total of 233,576 passengers on 19,510 planes. Top month, August, 40,000 passengers used the airport.

▶**Expreso Aero Inter-Americano**—Havana-Miami service by EAIA is granted by CAB to April, 1954.

▶**Lansa**—Colombian airline reportedly may get help from Avianca—may join Avianca to avoid financial trouble.

▶**Northwest Airlines**—CAB denies Northwest permission to stop serving Jamestown, N. D., and Boseman and Kalispell, Mont., without formal hearings.

▶**Pan American World Airways**—Pan-Am wants the CAB to hurry up separate hearings for its Paraguay-Venezuela non-top flight proposal. CAB has or-

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► **Philippine Air Lines**—An all-expense hunting trip to Central India from San Francisco is offered by Philippine Air Lines at $1207 for one person, $997 per person for two, or $913 per person for three or more. Trip includes eight days hunting with guides, etc. in the jungles, plus sightseeing and all other expenses. None-shooting traveling companions pay $126-$189 less for the 16-day tour. Among gunning attractions—tiger, bison, bear, panther, swamp deer, blue bull.

► **Trans-Canada Air Lines**—TCA now offers industrial and trade research and contacts service arranging for continental firms to find authoritative sources of information in any subject or locale. . . . Company district traffic managers will help with local contacts. . . . Foreign businessmen planning product promotion may get market data through TCA's overseas offices.

► **Standard Air Cargo**—Nonsked filing for round-trip military personnel transport at 2 cents a mile is denied by CAB pending hearings. The large irregular carrier wanted to start this by Feb. 21, but CAB has suspended the idea until May 21. . . . Several nonskeds have toyed with the idea of this 2-cent a mile fare, which is exempted from the 15 percent transportation tax. One angle under consideration is to charge only 2 cents straight, thus staying under the 2.025-cent tax-free ceiling, but collect an extra "dead-heading" or "waiting" charge from the passenger as a separate item.

► **Teterboro Airport**—New York Port Authority has okayed buying nine more parcels of land costing $111,700 to expand Teterboro. Authority plans to spend another $1,500,000 later. . . . Flying Tiger Lines has leased the 52,000-foot hangar 6 for five years at basic rental of $24,000 a year, plus 5 percent of gross receipts for work done on other planes.

► **Western Air Lines**—Western keeps on selling air safety, despite most airlines' preference for no mention of the safety angle at all. Latest promotion: "would you take a 20,000-to-1 bet?" Flight insurance companies bet $1,000,000 against $50 that your trip will be safe. Reaction of consumers to this particular peg is not reported by the company. . . . Extreme temperature differences in its service area are pointed up in a Western release telling of operations in the same day in Palm Springs at 84 above and Butte at 46 below.

AVIATION CALENDAR

Mar. 12-13—Short course on uses of aerial equipment in agriculture. Purdue University, West Lafayette, Ind.

Mar. 16—Sixth annual flight propulsion meeting, Institute of Aeronautical Sciences, Hotel Carter, Cleveland.

Mar. 19-23—Seventh Western Metal Exposition, Oakland Auditorium and Exposition Hall, Oakland, Calif.

Apr. 7-8—Tenth annual Holiday on Wings personal flyers excursion flight to Coronado, Calif., sponsored by Los Angeles Junior Chamber of Commerce.

Apr. 16-18—Society of Automotive Engineers aeronautic and aircraft engine display, Hotel Statler, New York.

Apr. 19-21—Airport Operators Council annual meeting, Hotel Peabody, Memphis, Tenn.

Apr. 23-24—Semi-annual meeting of the Air Industries & Transport Assn. of Canada, Harrison Hot Springs Hotel, Harrison, British Columbia.

Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.

May 12-13—Airlines Medical Directors Assn., eighth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 13-14—Airline Medical Examiners Assn. fourth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 14-16—Aero Medical Assn. 22nd annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 17-19—Annual convention of the Women's Aeronautical Assn., of the U. S., Little Rock, Ark.

June 11-15—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.

June 13-16—Aviation Writers Assn. convention, Hotel Commodore, N. Y.

June 15-July 1—International aviation display, Grand Palais and Le Bourget Airport, Paris.

June 18-22—Private seminar on organization and operation of company standardization work, to be held by Dr. John Gaillard, Engineering Societies Bldg., New York.

June 18-July 6—Three-week Air Age Institute course, Parks College of Aeronautical Technology of St. Louis University, East St. Louis, Ill.

June 23—1951 British National Air Races, Hatfield Aerodrome, Hertfordshire, for light, heavy craft, and jets. Entry blanks available from National Aeronautic Assn., 1025 Connecticut Ave., N.W., Washington 6. Closing date for receipt of entries is May 1.

June 25-29—1951 summer general meeting of the American Institute of Electrical Engineering, Royal York Hotel, Toronto.

Sept. 7-11—Third annual Anglo-American Aeronautical Conference, convened jointly by Royal Aeronautical Society and IAS, Brighton, England.

PICTURE CREDITS

9—(Grumman AF-28) Harold G. Martin; (F-86, CF-100) Avro Canada; 21, 25—Consolidated Vultee Air; 40—Pan American World Airways.

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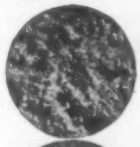
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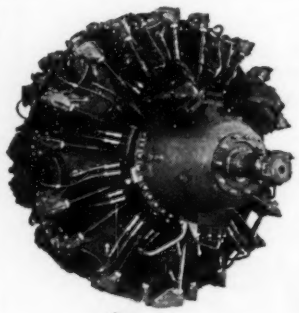

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11	UA-6012K-S30K	12 "	UB3250-30

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4	8503274	12 "	8504081
32	8503361	14 "	8503113
34	8503429	14 "	8504092
28	8503443	13 "	8503469
26	8503470	13 "	
6	8503800	14 "	8504093
36	8504481	13 "	
11	8504490	12 "	
17	8504491	14 "	8504092
188	8504709	13 "	8503496
399	8504985	14 "	8505334
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40	8505333	14 "	
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27953	8427	Screw
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1876	10759	Bolt
1600	11210	Cover
100	11762	Guide
7	26456-2	Bearing
1157	35787-5	Bushing
2174	35787-10	Bushing
39	35807-8	Stud
814	35814	Blower Assy.
3967	35817	Spring
280	35855	Cap
2446	35924	Washers
4200	35932	Gasket
6	37751	Cover
15	37993	Housing Stud
28	38314	Rod Assy. Comp
20	45213	Cover
182	46400E	Liner
30	48346	Cylinder
1	48347	Cylinder
1475	48360	Bearing
53	48362	Shaft
175	48363	Shaft
3	48388	Sump
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
533	48447	Bushing
107	48457	Adapter
76	48458	Bushing
390	48461	Gear
149	48468	Bearing
90	48468B	Bearing
389	48469	Bearing
470	48470	Bearing
75000	51506	Plug
395	54847	Clamp
71	56721	Cover
71	57006	Cover
10	68375	Gear
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5	77453	Housing (Reduction)
565	81397	Tube
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261	84235	Pipe
155	84281	Spacers
1351	84282	Adapter
12	84284	Adapter
1178	84289	Bearing
21	84314	Counter Balance
113	84487	Housing
87	84567-8	Stud
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162	3611-B	Amplifier
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7	AS27A/ARN-5	Antenna
9000	45	Bulb
11000	1667	Bulb
1000	987	Bulb
300	AN3135-1	Bulb
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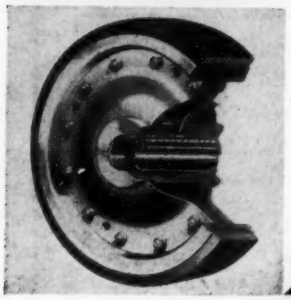

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Available from the Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, price $1.50.

In **Aircraft Designers' Data Book,** author Leslie E. Neville has compiled nearly 800 illustrations and sketches of aircraft design details—arranged in chapters corresponding to the airplanes' basic components—into a very comprehensive study that should be a distinct aid in showing engineers what has already been done in their particular fields and how ingenuity has solved past engineering headaches. The volume should also be of great interest to the fledgling.

Author Neville, for many years editor of Aviation magazine, and now with Curtiss-Wright Corp., used his experience to present his material in a clear, concise and sequential order. The size of the volume, approximately 9¼ by 11¼ in., permits a format allowing attractive presentation of drawings, cuts and text of sufficiently large size to retain their effectiveness.

Published by McGraw-Hill Publishing Co., Inc., 330 W. 42 St., New York 18, 534 pages, including index, price $10.

The **1950 Aircraft Yearbook,** 32nd official annual publication of the Aircraft Industries Assn. has been published by Lincoln Press, Inc. Book, edited by Fred Hamlin, has its usual statistical tables and reference departments, such as new things in the air, planes in production, engines in production, 1950 day by day chronology, aviation records.

Brief scrutiny indicates the new edition is in many respects an improvement in accuracy over the 1949 edition. Yearbook is obtainable from Lincoln Press, Inc., Warner Bldg., Washington 4, D. C., for $6.—A. McS.

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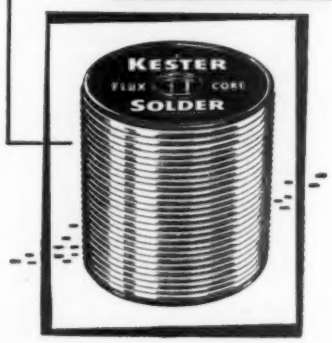

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AVIATION WEEK—MARCH 12, 1951

ADEL DIV. GENERAL METAL CORP. 28
Agency—The McCarthy Company

AERO TRADERS, INC. 59

AIRBORNE ACCESSORIES CORP. 8
Agency—Gray & Rogers Adv.

ALLISON DIVISION, G.M.C. ..... Fourth Cover
Agency—Kudner Agency, Inc.

ALLISON RADAR CORP. 65
Agency—Cromwell Adv. Agency, Inc.

AMERICAN CHEMICAL PAINT CO. 64
Agency—May Advertising Co.

AMERICAN NON-GRAN BRONZE CO. 59
Agency—Norman P. Hewitt Adv.

AVIATION ACCESSORIES, INC. 7
Agency—Kimball Adv. Agency

BEECH AIRCRAFT CORP. 32
Agency—Erwin, Wasey & Co., Inc.

BENDIX RADIO DIV. OF BENDIX AVIATION CORP. 39
Agency—MacManus, John & Adams, Inc.

B. H. AIRCRAFT CO., INC. 56
Agency—Harold Marshall Adv. Co.

BOWER ROLLER BEARING CO. ..... Second Cover
Agency—MacManus, John & Adams, Inc.

BOWSER, INCORPORATED 55
Agency—Charles Palm & Co.

BURNHAM & COMPANY 36
Agency—Doremus & Co.

CHERRY RIVET COMPANY 47
Agency—Hixson & Jorgensen, Inc.

CHICAGO METAL HOSE CORP. 50
Agency—Russell T. Gray, Inc.

CITIES SERVICE OIL CO. ..... Third Cover
Agency—Ellington & Co., Inc.

DARNELL CORPORATION, LTD. 64
Agency—Rhea Advertising Service

DOUGLAS AIRCRAFT CO., INC. 44, 45
Agency—J. Walter Thompson Co.

EASTMAN KODAK COMPANY 19
Agency—J. Walter Thompson Co.

ELECTRIC AUTO-LITE CO., THE 31
Agency—Ruthrauff & Ryan, Inc.

FAIRCHILD ENGINE & AIRPLANE CORP. 20
Agency—Buchanan & Co., Inc.

GENERAL ELECTRIC COMPANY 10
Agency—G. M. Basford Co.

GOODRICH CO., THE B. F. 3
Agency—Batten, Barton, Durstine & Osborn, Inc.

HART MANUFACTURING CO. 46
Agency—Wilson, Haight & Welch, Inc.

INTERNATIONAL NICKEL CO., INC., THE 24
Agency—Marschalk & Pratt Co.

JOY MANUFACTURING CO. 23
Agency—Walker & Downing Adv.

KESTER SOLDER COMPANY 64
Agency—Frank C. Nahser, Inc.

LEACH RELAY COMPANY 58
Agency—The McCarty Co.

LEWIS ENGINEERING CO., THE 25

MARMAN PRODUCTS CO., INC. 42
Agency—West-Marquis, Inc.

MINNEAPOLIS-HONEYWELL REGULATOR CO. ..... Front Cover
Agency—Foote, Cone & Belding

MONADNOCK MILLS 36
Agency—H. B. Humphrey, Alley & Richards, Inc.

NORTH AMERICAN AVIATION, INC. 65
Agency—Batten, Barton, Durstine & Osborn, Inc.

NORTHROP AIRCRAFT, INC. 48, 49
Agency—West-Marquis, Inc.

NUTT-SHEL COMPANY 29
Agency—Paul Sauer Adv.

OHIO SEAMLESS TUBE CO., THE 27
Agency—Howard Swink Adv. Agency, Inc.

PIASECKI HELICOPTER CORP. 58
Agency—B. K. Davis & Bro.

ROBINSON AVIATION, INC. 58
Agency—J. Branch Briggs Adv.

ROEBLING'S SONS CO., JOHN A. 4
Agency—Beatty & Oliver, Inc.

RUSSELL MFG. COMPANY 57
Agency—Charles W. Hoyt Co., Inc.

RYERSON & SON, INC., JOSEPH T. 43
Agency—Aubrey, Moore & Wallace Adv.

SEARCHLIGHT SECTION 59, 60, 61 62, 63

SENSENICH CORPORATION 57
Agency—Foltz-Wessinger, Inc.

SERVICE STEEL COMPANY 30
Agency—Claude E. Whipple Adv.

SERVOMECHANISMS, INC. 38
Agency—Sanger-Funnell, Inc.

SERVO-TEK PRODUCTS CO. 56
Agency—Gordon-Piling, Inc.

SKINNER PURIFIER DIV. OF BENDIX AVIATION CORP. 52
Agency—MacManus, John & Adams, Inc.

SOCONY-VACUUM OIL CO. 34, 35
Agency—Compton Adv., Inc.

STALWART RUBBER CO., THE 37
Agency—Penn & Hamaker, Inc.

STANDARD PRESSED STEEL CO. 53
Agency—R. E. Lovekin Corp.

TEXAS COMPANY, THE 6
Agency—Erwin, Wasey & Co., Inc.

UNITED AIRCRAFT CORP. 5
Agency—Geyer, Newell & Ganger, Inc.

UNITED STATES STEEL SUPPLY CO. 57
Agency—Batten, Barton, Durstine & Osborn, Inc.

WITTEK MANUFACTURING COMPANY 41
Agency—The Advertising Corp.

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SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant 60, 61, 62
Positions Wanted 59
Selling Opportunity Wanted 59

SPECIAL SERVICES
Contract Work 59

PLANES-EQUIPMENT
(Used or Surplus New)
For Sale 59, 61–63

WANTED
Planes-Equipment 59

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SECTION 3

NORTH AMERICAN AVIATION, INC.

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EDITORIAL

Frowzy Journalism

The March Cosmopolitan magazine sandwiches an aviation piece with Gloria Swanson's hot plaint that "Men Need a New Line," a provacative discussion asking, "Are Fight Referees Honest?" and a feature described as a "complete novel of violence and mystery."

We are hazy as to whether an article by somebody called W. B. Courtney is in the fact or fiction department of the issue, but the title is "Don't Fly the Unscheduled Air Lines!"

This piece starts out superimposed on a double-page spread photograph of the crashed and burned-out Seattle Air Charter DC-3. Under the title is a sub-head reading, "Low-cost, fly-by-night planes are no bargain. Too often they end up like this. The shocking facts about murder in the air."

We are ashamed of this kind of journalism, and of anyone in aviation who might have had anything to do with inspiring or supporting it. But this kind of misinformation and sensationalism will not harm aviation in the long-run. Only facts hurt and the truth and logic are not here.

The main title is unethical. The sub-title is shamefully inaccurate if it implies most nonsked flights end in crashes. If the editors argued that even one accident was "too often," whether scheduled or non-scheduled, then that's something else again. Whatever else it is, it is deceptive and misleading. The charge of "murder in the air!" is very serious wherever it appears, even alongside movie stars' advice to men.

The writer has taken the CAB's accident investigation report covering the lamentable Seattle crash in January 1949, added several embellishments of the truth (which the report didn't need), and has used this one accident to typify the operations of the entire non-schedule carrier group. Nearly half of the article describes the one accident. There are only two other crashes mentioned, each covered in a paragraph. And this comprises the author's "documentation" for his charge of murder in the air!

We deplore the Seattle accident. We cannot and would not defend it. But it is no more just or accurate to pick out the worst set of circumstances you can find to typify the nonskeds than it would be to do the same for the skeds. The SAC crash simply is not typical. And the nonskeds have made "tremendous improvement" in their safety record, the Flight Safety Foundation said recently, although it is still higher than the fatality rate for the scheduled carriers.

One nonsked industry spokesman said last week his industry in the past year and a half has flown over a billion passenger miles without a fatal accident and that such figures are on file with CAB.

The author of the Cosmopolitan story for a while hews to a theme that differentiates between the scheduled and non-scheduled carriers. He concedes that "the federal regulations for both are the same," a startling admission because he thus implies these companies are complying with the law while they commit this "murder in the air."

But if you really want to know why the skeds are safer, it's "frankly, because the skeds get that subsidy for carrying the mail." Now, follow this explanation closely:

"The government's paramount concern may be for the safety of the American public, but its opportunity to guarantee that safety arises, as is often the case, through the force of its monetary backing. In demanding the safety and regularity of the mail, *it forces additional safety measures on the scheduled airlines.*" (Italics ours.) Or, as the writer put it, "The nonskeds, receiving no subsidy, are not so heavily breathed upon; and they are under no compulsions to make large static investments in organization and maintenance, or in any safety measures beyong the minimums required to get their planes certificated. They are left free to concentrate on long hauls, tapping the best traffic centers, and to make use of whatever private or municipal facilities exist on their routes."

Frankly, we don't get this heavy extra regulatory breathing but it certainly sounds sinister and if we were a regular Cosmopolitan reader we'd quit right here and rush over to Gloria Swanson. But murder charges are serious accusations demanding careful reading, so we plow on.

We soon find this isn't just a matter of raising hell with the nonsked airlines. There's even more to all this. The author dedicates a hefty paragraph to almost everyone in private aviation, too, till he nearly convinces us we are getting to a pretty pass when we let any civilian or commercial plane take the air except a scheduled airliner.

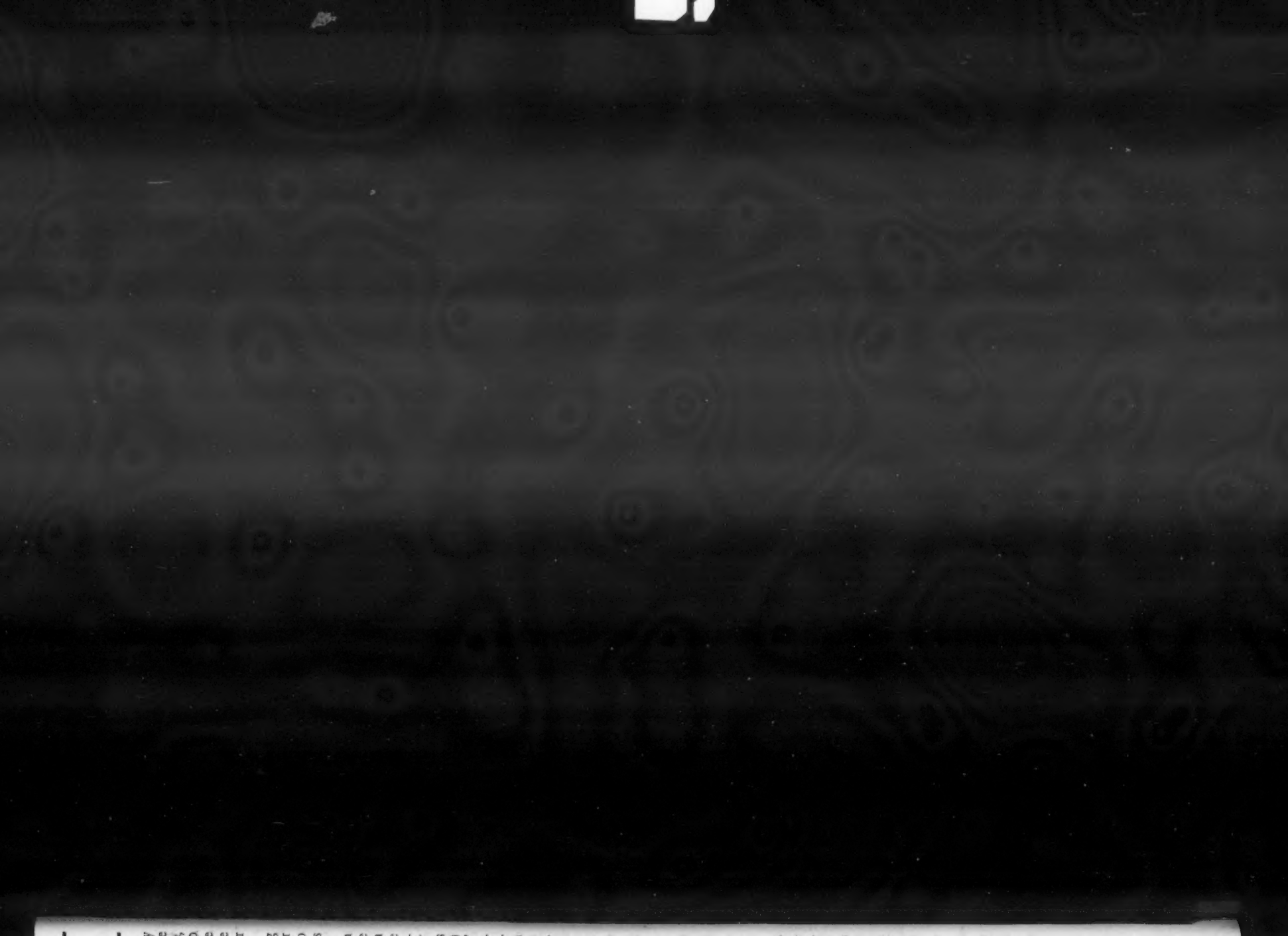
The writer indicates most "charter flyers" (now he seems to be talking about the little single-engine operators, too) are vets who were "laundered out of the air carrier scramble" and who took their war surplus planes into non-carrier activities. They are prepared to "take anyone, anywhere, anytime," and between taxi runs keep busy (this writer fella doesn't know much about private flying, does he?) with "student instruction, transmission-line patrolling, sightseeing hops, crop-dusting, forest fire fighting, and every odd air chore. . . . The non-carrier field is risky, and it cannot be controlled by CAA regulations or policed by CAA inspectors as thoroughly as the carrier operations are. Its carnage doesn't make the national headlines, because it comes in driblets. . . . But they mount up. . . ." We don't find out why CAA is so lax.

Up to now the scheduled lines probably thought they had the best of it, but we hope they haven't bought a lot of extra copies yet to distribute to their passengers and friends. Because the writer gets around to the subject of aviation generally, of whatever kind, with this calm and pseudo-scientific pronouncement—and we quote exactly:

But it is undeniably true that of all means of regular transportation mankind has devised, air travel is still the most inherently dangerous, because its vehicle has to contend with the laws of gravity ("what goes up must come down") in addition to the many dangerous physical laws ("irresistible force meets immovable body") that act upon all ground vehicles. That is why pilots have always referred to altitude as "money in the bank." Except in rarest instances, "air" deaths do not happen in the air (Despite the sub-title—Ed. Note). They happen on the ground—more than 70 percent in landings and take-offs alone in 1948. . . .

We don't know whether this refers to all aviation, just to irregular carriers, or how the nonskeds can be blamed for this statistic, but we suppose it must prove undeniably that air travel is still the most "i'nherently" dangerous.

We've never seen such rubbish, or so much of it, since the same publication had its last aviation fit in April 1949. Then it also lambasted private flying with an article headlined, "Damn Fools in the Air." As in the latest instance, its subtitle ran a little wild: "There are no stupider people anywhere than those who fly private planes. Stupid? They are vicious, criminal damn fools. Let's get rid of them before they give a black eye to organized air service."

Tsk, tsk, Mr. Hearst.

—Robert H. Wood